

# Medical Times

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## CONTENTS

### GENERAL SCIENTIFIC.

- The Nature, Manner of Conveyance and Means of Prevention of Infantile Paralysis ..... 239  
SIMON FLENNER, M. D., New York.
- The Tonsils ..... 242  
J. C. McE. AUWERDA, M. D., Brooklyn, N. Y.
- Sub-Deltoid Bursitis; Congenital Club Foot ..... 244  
WILLIAM FRANCIS CAMPBELL, M. D., Brooklyn, N. Y.
- Concerning Heredity ..... 246  
LAWRENCE IRWELL, B. C. L., Buffalo, N. Y.
- Induced Leucocytosis as an Aid to Surgery ..... 249  
WILFRED G. FRALICK, M. D., New York.
- In a Military Hospital ..... 251  
HENRY C. COE, M. D., New York.

- Scientific Researches Into the Causes of Alcoholism and Inebriety ..... 252  
T. D. CROTHERS, M. D., Hartford, Conn.
- The Origin and Development of the Society of Medical Jurisprudence ..... 253  
JOHN C. WEST, Esq., New York.

### THE DIAGNOSTIC LABORATORY ..... 255

### SPECIAL ARTICLE.

- Acute Poliomyelitis ..... 257
- AM. ASSN. CLINICAL RESEARCH**  
Scientific Medicine Versus Speculative Medicine ..... 258  
JAMES KRAUSS, M. D., Boston, Mass.

### EDITORIAL.

- Poliomyelitis ..... 263  
The Turning of the Worm ..... 263

- The Care of Dependent Children ..... 263  
Does Labor Favor Compulsory Health Insurance? ..... 264  
The Physical Cause of the Death of Christ ..... 264  
Which is the Sounder Opinion? ..... 264  
Our Alien Guests ..... 264  
Alcoholism in England After the War ..... 265  
Thought and Action ..... 265

### MISCELLANY.

- Ape-like Tommies, Soldierly Apes and the Military Reclamation of Human Wastrels ..... 265  
Rational Family Limitation and War ..... 266  
The Dog-in-the-Manger Type of Reactionary ..... 266  
The Psycho-Pathology of Pacifism and Militarism ..... 266  
The Medical Trust Hypothesis ..... 266  
The Quacks and Our Solemn Selves ..... 267  
Answer to Correspondent ..... 267

### CORRESPONDENCE ..... 267

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## General Scientific

### THE NATURE, MANNER OF CONVEYANCE AND MEANS OF PREVENTION OF INFANTILE PARALYSIS.\*

SIMON FLEXNER, M. D.

DIRECTOR OF LABORATORIES OF ROCKEFELLER INSTITUTE.  
New York.

Although the micro-organism of infantile paralysis is now known, the difficulties attending its artificial cultivation and identification under the microscope are such as to make futile the employment of ordinary bacteriological tests for its detection. Nevertheless, the virus can be detected by inoculation tests upon monkeys. In this manner the fact has been determined that the mucous membrane of the nose and throat of healthy persons who have been in intimate contact with acute cases of infantile paralysis may become contaminated with the virus, and that such contaminated persons, without falling ill themselves, may convey the infection to other persons, chiefly children, who develop the disease.

Microorganisms which convey disease escape from the body of an infected individual in a manner enabling them to enter and multiply within fresh or uninfected individuals in such a manner as to cause further disease. The virus of infantile paralysis is known to leave the infected human body in the secretions of the nose, throat and intestines. It also escapes from contaminated healthy persons in the secretions of the nose and throat.

At one time certain experiments seemed to show that biting insects, and particularly the stable fly, might withdraw the virus from the blood of infected persons and inoculate it into the blood of healthy persons. But as the virus has never been detected in the blood of human beings and later experiments with the stable fly have not confirmed the earlier ones, this means of escape of the virus must be considered doubtful. On the other hand, it has been shown by experiments on animals, so that the same facts should be regarded as applicable to human beings, that the virus seeks to escape from the body by way of the nose and throat, not only when inoculation takes place through these membranes, but also when the inoculation is experi-

mentally made into the abdominal cavity, the blood, or the brain itself.

The physical properties of the virus of infantile paralysis adapt it well for conveyance to the nose and throat. Being contained in their secretions, it is readily distributed by coughing, sneezing, kissing and by means of fingers and articles contaminated with these secretions, as well as with the intestinal discharges. Moreover, as the virus is thrown off from the body mingled with the secretions, it withstands for a long time even the highest summer temperature, complete drying, and even the action of weak chemicals, such as glycerin and carbolic acid.

Hence mere drying of the secretions is no protection; on the contrary, as the dried secretions may be converted into dust which is breathed into the nose and throat, they become a potential source of infection. The survival of the virus in the secretions is favored by weak daylight and darkness, and hindered by bright daylight and sunshine. It is readily destroyed by exposure to sunlight.

Certain experiments indicated that the biting stable fly could both withdraw the virus from the blood of infected and reconvey it to the blood of healthy monkeys, which became paralyzed. But more recent studies have failed to confirm the earlier ones.

Domestic flies experimentally contaminated with the virus remain infective for forty-eight hours or longer. Animals which have especially come under suspicion as possibly distributing the germ of infantile paralysis are poultry, pigs, dogs and cats. But in isolated instances sheep, cattle and even horses have been suspected. Experimental studies have, however, excluded the above mentioned animals from being carriers of the virus of infantile paralysis. The paralytic diseases which they suffer have long been known and are quite different from infantile paralysis. Their occurrence may be co-incidental; in no instance investigated has one been found to be responsible for the other.

Studies carried out indicate that, in extending from place to place or point to point, the route taken is that of ordinary travel. This is equally true whether the route is by water or land, along a simple highway or the line of a railroad. The virus of infantile paralysis is destroyed in the interior of the body more quickly

\*Abstract of a paper read before a Conference of Physicians in New York, July 13, 1916.



and completely than, in some instances, in the mucous membrane of the nose and throat. It has been found in monkeys, in which accurate experiments can be carried out, that the virus may disappear from the brain and spinal cord within a few days to three weeks after the appearance of the paralysis, while at the same time it is still present upon the mucous membranes mentioned.

The longest period after inoculation in which the virus has been detected in the mucous membrane of the nose and throat of monkeys is six months. It is far more difficult to detect the human than the monkey carriers of the virus. Yet in an undoubted instance of the human disease the virus was detected in the mucous membrane of the throat five months after its acute onset. Hence we possess conclusive evidence of the occurrence of occasional chronic human carriers of the virus of infantile paralysis.

Not all epidemics are equally severe. The extremes are represented by the occasional instances of infantile paralysis known in every considerable community and from which no extension takes place, and the instances in which in a few days or weeks the number of cases rises by leaps and bounds into the hundreds, and the death rate reaches 20 per cent. or more of those attacked. A factor of high importance is the virulence of the micro-organism causing the disease. The virus as ordinarily present in human beings even during severe epidemics has low infective power for monkeys. But by passing it from monkey to monkey it tends to acquire, after a variable number of such passages, an incredible activity. However, occasional samples of the human virus refuse to be thus intensified. But once rendered highly potent, the virus may be passed from monkey to monkey through a long but not indefinite series.

Not all children and relatively few adults are susceptible to infantile paralysis. Young children are more susceptible, generally speaking, than older ones; but no age can be said to be absolutely insusceptible. When several children exist in a family or in a group, one or more may be affected, while the others escape or seem to escape. This means that the term infantile paralysis is a misnomer, since the disease arises without causing any paralysis whatever, or such slight and fleeting paralysis as to be difficult of detection.

The abortive cases indicate a greater general susceptibility than has always been recognized, and their discovery promises to have far reaching consequences in respect to the means employed to limit the spread or eradicate foci of the disease. The period of incubation is subject to wide limits of fluctuation; in certain instances it has been as short as two days, in others it has been two weeks or possibly even longer. But the usual period does not exceed about eight days.

Probably the period at which the danger of communication is greatest is during the very early and acute stage of the disease. This statement must be made tentatively since it depends on inference, based on general knowledge of infection, rather than on demonstration. Judging from experiments on animals, the virus tends not to persist in the body longer than four or five weeks except in those exceptional instances in which chronic carriage is developed. Hence cases of infantile paralysis which have been kept under supervision for a period of six weeks from the onset of the symptoms may be regarded as practically free of danger.

Infantile paralysis is one of the infectious diseases in which insusceptibility is conferred by one attack. The evidence derived from experiments on monkeys is con-

clusive in showing that an infection which ends in recovery gives protection from a subsequent inoculation. Observations upon human beings have brought out the same fact, which appears to be generally true, and to include all the forms of infantile paralysis, namely, the paralytic, meningeal or abortive, which all confer immunity.

The blood of normal persons and monkeys is not capable of destroying or neutralizing the effect of the virus of infantile paralysis. The blood of persons or monkeys who have recovered from the disease is capable of destroying or neutralizing the effect of the virus. The immunity to subsequent infection, whether occurring in human beings after exposure or monkeys after inoculation, rests on the presence of the so-called immunity bodies. So long as they persist in the body, protection is afforded, and their presence has been detected twenty years or even longer after recovery from infantile paralysis. Protection has been afforded monkeys against inoculation with effective quantities of the virus of infantile paralysis by previously subjecting them to inoculation with sub-effective quantities or doses of the virus. By this means and without any evident illness or effect of the protective inoculation complete immunity has been achieved. But the method is not perfect since in certain instances not only was immunity not obtained but unexpected paralysis intervened. In the instances in which protection was accomplished the immunity bodies appeared in the blood.

By transferring the blood of immune monkeys to normal or untreated ones, they can be rendered immune, and the immunity will endure for a relatively short period during which the passively transferred immunity bodies persist. The accomplishment of passive immunization is somewhat uncertain, and its brief duration renders it useless for purposes of protective immunization.

On the other hand, a measure of success has been achieved in the experimental serum treatment of inoculated monkeys. For this purpose blood serum derived either from recovered and protected monkeys or human beings has been employed. The serum is injected into the membranes about the spinal cord, and the virus is inoculated into the brain. The injection of serum must be repeated several times in order to be effective.

Use of this method has been made in a few instances in France, where the blood serum derived from persons who had recovered from infantile paralysis has been injected into the spinal membranes of persons who have just become paralyzed. The results are said to be promising.

The virus of infantile paralysis attacks and attaches itself to the central nervous organs. Hence it is reached not only with difficulty because nature has carefully protected those sensitive organs from injurious materials which may gain access to the blood, but it must be counteracted by substances and in a manner that will not themselves injure those sensitive parts. The ideal means to accomplish this purpose, is through the employment of an immune serum, since serums are among the least injurious therapeutic agents.

The only drug which has shown any useful degree of activity is hexamethylenamin, which is itself germicidal, and has the merit of entering the membranes, as well as the substance of the spinal cord and brain in which the virus is deposited. But experiments on monkeys have shown this chemical to be effective only very early in the course of the inoculation and only in a part of the animals treated.



Efforts to modify and improve this drug by chemical means have up to the present been only partially successful. The experiments have not yet reached the point where the new drugs are applicable to the treatment of human cases of infantile paralysis.

#### Practical Deductions and Application.

1. The chief mode of demonstrated conveyance of the virus is through the agency of human beings. Whether still other modes of dissemination exist is unknown. According to our present knowledge, the virus leaves the body in the secretions of the nose and throat and in the discharges from the intestines. The conveyers of the virus include persons ill of infantile paralysis in any of its several forms and irrespective of whether they are paralyzed or not, and such healthy persons who may have become contaminated by attendance on or association with the ill.

How numerous the latter class may be is unknown. But all attendants on or associates of the sick are suspects. These healthy carriers rarely themselves fall ill of the disease; they may, however, be the source of infection in others. On the other hand, the fact that infantile paralysis is very rarely communicated in general hospitals to other persons indicates that its spread is subject to ready control under restricted and supervised sanitary conditions.

2. The chief means by which the secretions of the nose and throat are disseminated is through the act of kissing, coughing or sneezing. Hence during the prevalence of an epidemic of infantile paralysis, care should be exercised to restrict the distribution as far as possible through these common means.

3. Flies often collect about the nose and mouth of patients ill of infantile paralysis and feed on the secretions, and they even gain access to the discharges from the intestines in homes unprotected by screens. This fact relates to the domestic fly, which, becoming grossly contaminated with the virus, may deposit it on the nose and mouth of healthy persons, or upon food or eating utensils.

Food exposed to sale may become contaminated by flies or from fingers which have been in contact with secretions containing the virus; hence food should not be exposed in shops and no person in attendance upon a case of infantile paralysis should be permitted to handle food for sale to the general public.

4. Protection to the public can be best secured through the discovery and isolation of those ill of the disease, and the sanitary control of those persons who have associated with the sick and whose business calls them away from home.

Care exercised not to scatter the secretions of the nose and throat by spitting, coughing and sneezing, the free use of clean handkerchiefs, cleanliness in habits affecting especially the hands and face, changes of clothes, etc., should all serve to diminish this danger.

5. The degree of susceptibility of children and other members of the community to infantile paralysis is relatively small and is definitely lower than to such communicable diseases as measles, scarlet fever and diphtheria. This fact in itself constitutes a measure of control, and while it does not justify the abatement of any practicable means which may be employed to limit and suppress the epidemic, it should tend to prevent a state of overanxiety and panic from taking hold of the community.

6. A percentage of persons, children particularly, die during the acute stage of the disease. This percentage varies from five in certain severe epidemics to twenty in others. The average death rate of many epidemics

has been below 10 per cent. A reported high death rate may not be actual, but only apparent, since in every instance the death will be recorded, while many cases which recover may not be reported at all to the authorities.

7. Of those who survive a part make complete recoveries, in which no crippling whatever remains. This number is greater than is usually supposed, because it includes not only the relatively large number of slight or abortive cases, but also a considerable number of cases in which more or less of paralysis was present at one time. The disappearance of the paralysis may be rapid or gradual—may be complete in a few days or may require several weeks or months.

The remainder, and unfortunately not a small number, suffer some degree of permanent crippling. But even in this class the extent to which recovery from the paralysis may occur is very great. In many instances the residue of paralysis may be so small as not seriously to hamper the life activities of the individual: in others in whom it is greater it may be relieved or minimized by suitable orthopedic treatment.

But what it is imperative to keep in mind is that the recovery of paralyzed parts and the restoration of lost muscular power and function is a process which extends over a long period of time—that is, over months and even years. So that even a severely paralyzed child who has made little recovery of function by the time the acute stage of the disease is over may go on gaining for weeks, months, and even years until in the end he has regained a large part of his losses.

There exists at present no safe method of preventive inoculation or vaccination, and no practicable method of specific treatment.

**Note.**—At the same meeting Dr. S. J. Meltzer, of the Rockefeller Institute, recommended intraspinal injections of adrenalin as a possible cure for infantile paralysis. He said:

"On the basis of experiments conducted by our researchers I would advocate the treatment of all cases of infantile paralysis by intraspinal injections of a solution of adrenalin. Clinical experiments conducted at the institute by Dr. Clark and myself on monkeys artificially infected with infantile paralysis have produced encouraging results."

#### Quartan Malaria: Relapse 42 Years Later.

I. van der Heijden records in the *Nederlandsch Tijdschrift voor Geneeskunde* (1915, vol. ii, p. 1680) the case of a laboring man, aged 64 years, living in Rotterdam, who developed a typical quartan malaria in February, 1915. The patient's blood contained the characteristic parasites, and the fever was rapidly cured by the exhibition of sulphate of quinine. The writer remarks that cases of quartan malaria, never common, are unknown in the quarter of the town in which this instance occurred, as also is the anopheles; he concludes that the patient had a relapse from an old infection occurring when he was 20 years old. At this period the man was working as a farm laborer near Leyden, and lived in the same house as a peasant who was suffering from quartan ague. Dr. van der Heijden's patient was attacked by the fever himself and suffered from it for about a couple of years. He remembered that during this time he was able to work for periods of two and a half days, but then had to go to bed when the sweating stage supervened in the afternoon; next day he would be fatigued, but able to work. After about two years he was given a medicine, presumably one containing quinine, that cured both himself and the peasant. The quartan ague never returned till 1915. Dr. van der Heijden comes to the conclusion that there can be no question of a new infection with the parasites of quartan malaria in this instance; he is therefore obliged to conclude that the case was one of a relapse 42 years after the original infection. He notes that the patient had been living in Rotterdam for the last few years—he does not say for how many—and he presumes that he had the quartan parasites latent in his bone marrow all the time.

### THE TONSILS.\*

J. C. MACÉ. AUWERDA, M. D.  
Brooklyn, New York.

Since the consensus of opinion at the present time is that diseased tonsils should be completely enucleated, rather than "snipped off," as in tonsillotomy, a description of the most recent and effective method will be worth your while to consider.

But before taking up the technic of the Sluder operation there are a few points in diagnosis to which I should like to call your attention. It frequently happens that a patient presents himself for treatment complaining of some systemic disturbance which is frequently caused by infection gaining entrance into the blood or lymph streams, from organisms in the tonsillar crypts, with or without primary lesions in the tonsils themselves. Among the infections that have been attributed to this source are: acute arthritis, pericarditis, acute and chronic nephritis, osteomyelitis, peritonitis, infectious jaundice, endocarditis, chorea, neuritis, appendicitis, pulmonary gangrene, and cervical adenitis of simple inflammatory or tuberculous origin. To the foregoing may be added chronic toxemia without localized lesions other than those in the tonsils themselves.

This is by no means a complete list of infectious processes that have been reported as occurring secondarily to tonsillar infections, but serves to show the importance of a careful examination of the tonsils before attempting to treat a disease which is apparently from some other source, but which in reality is due primarily to the tonsil.

Do not make the mistake of glancing at the tonsils, and, not finding them inflamed, hypertrophied, or with white stops protruding from the mouth of the crypts, conclude that they are normal.

If in many of these cases of apparently healthy looking tonsils, a dull, flat tongue depressor be pressed outward and backward against the anterior pillar of the tonsil a considerable amount of foul smelling, cheesy debris can be expressed from the crypts. Another place that has not been given consideration in the textbooks is the anterior fossa between the anterior pillar and the wall of the tonsil, where a considerable amount of this material is frequently found and is at times the starting point of a peritonsillar abscess; pressing a flat instrument against the tonsil does not always suffice to demonstrate this, in which case a retractor should be used to pull the anterior pillar forward and outward.

You will be surprised at the number of apparently healthy tonsils that are really diseased if you will take the time and trouble to examine them properly. The supratonsillar fossa is another location for these pus collections which are constantly being manufactured in diseased tonsils and which are as constantly being swallowed and absorbed, acting as a gastric as well as a systemic poison.

*The lymphatics as an aid to diagnosis, according to the data and principles elaborated by Barnes:*

No afferent lymphatic stems have been demonstrated leading to the tonsils.

The efferent lymphatics of the tonsil pass through the fibrous trabeculae and the capsule, pierce the superior constrictor muscle of the pharynx and empty into the tonsillar gland, one of the superior deep cervical nodes lying under the anterior border of the sterno-mastoid muscle, in the angle between the internal jugular and facial veins. It is one of the most constant in position of all the cervical nodes. When enlarged it projects anteriorly beyond the anterior border of the

sterno-mastoid and appears superficially from  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch below the angle of the jaw.

As cases of cervical adenitis frequently occur and the question is asked, "Is the tonsil the source of infection," and as the tonsillar gland or the glands in the immediate vicinity receive their afferents from so many different parts, lesions of which may give rise to adenitis easily confounded with that due to infections through the tonsils, a brief description of the deep cervical glands will be given here.

The deep cervical nodes, ten to sixteen in number, extend along the course of the internal jugular vein from the tip of the mastoid to the level at which the vein is covered by the omohyoid muscle. From a clinical standpoint they may be divided into an anterior and posterior group. The posterior glands lie deep under the sterno-mastoid or along its posterior border.

They receive their afferents from:

(1) The superficial nodes in the suboccipital and mastoid regions.

(2) From the retro-pharyngeal glands.

(3) From the mucosa of the pharynx and nasopharynx and nasal mucosa posteriorly including that of the sinuses. When enlarged they are difficult to feel as discrete nodes, but form an indefinite swelling under the sterno-mastoid, and any infection in the wide field from which their afferents are derived may cause their enlargement. Pediculosis and lesions of the lateral and posterior pharyngeal nodules are frequently overlooked. Their enlargement without involvement of the anterior glands cannot be attributed to the tonsil.

The anterior glands form a chain lying just under the anterior border of the sterno-mastoid. They receive their afferents from the tonsil and the base of the tongue and from the submaxillary and submental nodes. Stems from the body of the tongue also pass directly to one of the anterior glands lying somewhat below the tonsillar gland. The most posterior of the submaxillary glands is commonly confounded with the tonsillar gland. It is situated just under and anterior to the angle of the jaw. It is never enlarged from infection through the tonsil. One of the most common causes of its enlargement, beyond perfectly obvious conditions of the gums or tongue or cheek, and one that is frequently overlooked, is an abscess around an old tooth root.

If the tonsillar gland enlarges alone and there is no lesion at the base of the tongue, the enlargement may be attributed to infection through the tonsil.

If the sub-maxillary glands are involved at the same time the source of the infection should be looked for anteriorly.

Cases in which the posterior cervical glands are involved coincidentally with the tonsillar gland are difficult to decide.

If it is possible for a gland to become infected through its efferent lymphatics, the tonsils might be a cause of enlargement of the posterior group. In most of these cases, however, the infection is undoubtedly of double origin, the lateral and posterior pharyngeal nodules or the adenoid tissue of the vault being responsible for the posterior enlargement.

The inferior group of the cervical lymph nodes receives its afferents from the upper nodes. They are of importance in connection with the tonsils chiefly because of the possibility of tuberculous infection reaching the pulmonary apices by this route. The tonsil is so placed that its posterior inferior limits are just in front of and above the angle of the jaw. It cannot be felt on the outside except in cases of malignant growths.

\* Read before the Brooklyn Hospital Club, June 23, 1916.



From this diagnostic and pathologic survey we shall now pass to operative considerations.

Why is the Sluder operation better than the snare operation?

1. It completely enucleates the tonsil.
2. It takes less time.
3. The patient receives less anesthetic.
4. There is less traumatism.
5. A larger percentage of all tonsils can be removed without previous dissection.

The technic of the Sluder guillotine operation is but a modification of the old-fashioned tonsillotomy. In the later operation only the epithelial face of the tonsil, or the portion that projected beyond the pillars, was cut away, since it was all that could be forced through the fenestra of the guillotine.

Pedunculated tonsils were often removed completely by this method. Sluder's technic enables the operator to remove with the guillotine a large percentage of all tonsils, pedunculated or buried in their capsules, by taking advantage of the free mobility of the tissues of the sinus tonsillaris, and the bony prominence of the posterior extremity of the alveolar process of the lower jaw. The tonsil is usually attached loosely to the wall of the sinus tonsillaris, to which it bears the relation of a slightly opened bud to its calyx.

What we have to say about operative details is based upon the teachings of Sluder himself. If the ring of the guillotine is passed around the tonsil and pressed outward it tends to peel the calyx back and to unbutton the tonsillar bud from it. The bony surface at the angle of the jaw is not usually sufficiently prominent to effect this unbuttoning and to push the tonsil through the opening of the instrument. To gain this result the tonsil, after being partially engaged in the fenestra, is brought forward and slightly upward until its root or capsular surface rests over the bony prominence of the posterior part of the alveolus. With this bony projection on its outer side, pressure outward with the ring of the guillotine produces a complete evulsion of the tonsillar bud from its calyx.

It is then easily removed in capsule by the closure of the instrument, whether prominent or buried.

**Technic.**—When using the Sluder method one must approach the tonsils at an angle of approximately 45 degrees, which requires the shaft of the instrument to cross the mouth entirely from the opposite side.

This necessitates the distal side of the shaft being applied to the tonsil. It at the same time has the great advantage of leaving the lateral portion of the field of operation wide open for view and giving free use of the fingers of the other hand.

The use of the proximal side will be found exceedingly awkward or even impossible, as the surgeon's hands are interfered with and the lateral portion of the field of operation is covered from view. It is a very great advantage to operate on the right tonsil by holding the guillotine in the right hand and on the left tonsil by holding it in the left hand. If the surgeon can use only one hand, the position of the patient should be recumbent. Assuming that he uses his right hand for both tonsils and stands on the patient's right, for the right one he faces the patient's head, while for the left one he must turn around so that he faces the patient's feet, and stands somewhat beyond (above) his head. The head should be held firmly by an assistant to prevent rotation, and the mouth kept fully open by a gag. Regardless of what may be the position of the patient's head, the surgeon takes his bearings from the lower jaw.

The guillotine with the transverse axis of the aperture vertical is introduced into the mouth at an angle of 45 degrees outward and backward, passing back until the distal arc of the aperture is completely behind the tonsils. The direction of the shaft is then changed to point downward in order to get the ring of the aperture under the lowermost part of the tonsil. The instrument at this moment may sometimes be rotated slightly by turning the handle downward (toward the feet). This tends to enlarge the field of vision. It is then pressed outward until the distal arc of the aperture has been pressed against the ramus of the jaw. It is now brought slightly forward and upward, but held firmly against the bone and muscle, when it will be seen that the distal end has acted very much like a scoop, having secured the lower part of the tonsil and brought it forward and upward into the neighborhood of the alveolar eminence.

In case the shaft has been rotated to secure its lower part, it is now put back into its original position by turning the handle upward. The upward part of the tonsil is usually put into the grasp of the distal arc of the aperture by this rotation. If the tonsil is not too large and flat (thin), it is usually secured by both its lower and upper poles in the first setting of the guillotine and no rotation is needed. The distal arc of the aperture is now firmly held behind the posterior border of the tonsil, and the instrument drawn forward and upward at an angle of approximately 45 degrees, which will be found to have pulled it upward and forward on to the eminence of the alveolus.

The blade is now pushed down with the gentlest possible pressure, until the surgeon sees that it is in contact with the tissues. It should not be pushed forcibly until the parts are engaged satisfactorily in the aperture. The blade being in contact with the tissues, prevents the portion of the tonsil which has gone through from slipping out again.

At this moment the surgeon may perceive that, although the distal arc of the aperture is entirely behind and external to the tonsil, a part of its anterior portion has still not gone through. This is usually readily seen, but may more definitely be determined by feeling with the tip of the index finger of the other hand, and at the same time it may be pushed through. This is done by the gentlest massage, simply stroking in the direction of the aperture with the ball of the index finger, and at the same time pushing the blade very gently across the remaining portion of the aperture.

When the last of the anterior portion has gone through it may be easily seen as a rule; but this may be determined with greater accuracy by feeling with the ball of the index finger, pushing it up and down over the end of the blade as it closes the aperture. If all the tonsil has gone through, the distal arc will be felt smooth and firm and covered by what seems to be a thick mucous membrane (it is, of course, covered by two layers of mucous membrane). If a part of the tonsil has not gone through, it can easily be felt and recognized as a mass of tissue harder than membrane and usually irregular.

All the tonsil having gone through, the blade is now pushed across with all the power of the surgeon's hands. Great pressure is usually required because the blade has been made dull. If it be too dull, or if it does not fit perfectly into the metal lining of the distal arc of the aperture, it will not cut altogether through. The blade must then be withdrawn a little, the unengaged tissue be tucked in with a finger of the other



hand and then included in the bite. This does not delay the operation; it may possibly make a little more subsequent pain owing to the increased traumatism. But notwithstanding this the traumatism so produced is not nearly so great as that produced by the dissection necessary for the snare operation.

If the operator does not happen to be a powerful individual he will have difficulty in many of his cases in pushing the blade of the guillotine home. This difficulty is obviated by the Sauer modification of the Sluder instrument. This has a screw attachment which is put into gear after a partial closure of the instrument has caught the tonsil in the correct position.

332 Jay Street.

### SUB-DELTOID BURSITIS; CONGENITAL CLUB FOOT.

From the Surgical Clinic of

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#### Sub-Deltoid Bursitis.

**History:** Patient, male, forty-six years old enters hospital because of a swelling of the left shoulder and constant pain in the back. There is no history of traumatism nor of any strain due to overwork. About two years ago there was first observed some slight swelling and stiffness in this shoulder, which gradually grew worse, until at present there appears to be a large tumor at the shoulder with much functional disability. There is no pain in the tumor itself, but a great deal of pain radiating toward the back (Fig. 1).



Fig. 1—Appearance of shoulder before operation.

**Examination:** There is a large smooth tumor of the left shoulder as shown in figure one. There is slight tenderness, no pain at site of swelling, no fever, functional activity reduced about one-half. It is impossible to abduct the arm more than seventy-five degrees. *The patient complains of no pain in the tumor—but of much pain in the back.*

The consistency of the tumor is soft and palpates like fluid. There is no pulsation or thrill heard with the stethoscope—no difference in the radial pulse.

In aspirating the tumor there is readily withdrawn a sero-sanguinous fluid.

**Comment:** This tumor of the shoulder presents a

fruitful source of speculation when we consider the various diagnoses that have been advanced, even malignancy has been suggested, and amputation and radium treatment advised.

There is little excuse for confusion if the history of the case be carefully noted. After all *the history tells the story of the disease*, and diagnosis is just crystallizing the history and clinical findings into a pathological entity. The fine art of diagnosis is really an interpretation of the history and clinical findings, and it requires a higher type of mentality than is demanded at the operating table.

There are two outstanding facts in this history—*chronicity, and painlessness of the tumor*. Neither of these elements would be present in a malignant growth.

Again, there is no muscular rigidity or temperature. Both of these elements would be present in a tuberculous shoulder.

Besides this the tumor is cystic and contains as demonstrated by the aspirating needle blood stained fluid.

What is there in this region which could continue to enlarge for a period of two years without causing any constitutional disturbance—that produces only pressure effects and contains serum? There is but one such structure outside the joint itself—namely the sub-deltoid bursa. Beneath the deltoid muscle where it passes over the greater tuberosity of the humerus is a bursa interposed between this prominence and the muscle. This is the structure which we believe has become enormously enlarged and forms the tumor of the shoulder.

You will recall that the bursae are sacs filled with a sort of lubricating fluid, found in places where friction occurs between different structures—as at the knee, the elbow, the tuberosities of the ischium—these points of friction are protected by bursae which minimize the friction by this pseudo joint function. When the friction becomes excessive and produces inflammation of the bursae, then the excessive secretion causes the bursae to distend and considerably enlarge, sometimes even to suppuration. This is illustrated in "Miner's Elbow," "Housemaid's Knee," "Coachman's Bursitis," etc. These pathological products are all the result of overuse or excessive friction at the protected point. Thus it will be observed that the underlying cause of the bursal inflammation is largely occupational. The miner subjects the elbow to constant friction, and the protective bursa over the olecranon if irritated too long will inflame, enlarge, and give us an *olecranon bursitis*. So with the housemaid subjecting the knee to excessive friction we observe the prepatella bursitis common among scrubwomen. Thus we observe that overuse of the bursa over a long period is the common cause of enlarged bursae.

We must not forget that these bursae are pseudo-joints and subject to the same diseases as the joints. We cannot account for all enlarged bursae through occupational friction. In the patient before us there is no history of any excessive exercise or use of this particular bursa—in fact the patient has led a most sedentary life, he has never indulged in any form of athletics that could possibly contribute to the enlargement of this bursa. *How then could the bursa enlarge?* These bursae are subject to the same diseases as the joints, of which they are transitional types. *Tuberculosis of the bursae* while not common is always to be recalled when the enlarged bursa cannot be attributed to excessive friction. We are inclined to believe that this enormously enlarged bursa has a tuberculous basis.

**Operation:** We shall make a longitudinal incision over the deltoid, parallel with its fibers. We must not forget the circumflex nerve, that it innervates the deltoid, and that the deltoid is the only abductor of the arm. We must not lose the use of the deltoid, hence we separate the muscle fibers and reach the smooth distended capsule of this enormously enlarged bursa. We shall endeavor to dissect out this cystic tumor without rupturing it. We are succeeding very well, but it is firmly adherent to the greater tuberosity—and we cannot detach it without opening it. As the tumor is opened you notice the escape of a number of bodies resembling melon seeds. This tells the story—it is unquestionably tuberculous.

Having dissected out the sac completely we close the wound with a drain at the lower angle and place the arm in a sling.

**The Specimen:** This is a most interesting specimen, not only because of its size but because of its contents. (Fig. II.) It is filled with serous fluid containing hundreds of small bodies like "melon seeds." These are not free in one large cavity but are sequestered in a number of smaller communicating cavities as if one were added on to the other like a number of extensions in the process of enlargement. The lining membrane of the sac is like the synovia of a true joint and to all practical intents functionates in the same way and serves the same purpose of lubrication.

**Whence came these "melon seed" bodies?** This is one of the peculiar manifestations of tuberculosis found in connection with tendon-sheaths and bursae. Small tuberculous granulations form on the serous surface, grow, undergo fibroid changes, become loosened, and thus there are accumulated a number of these detached bodies which are spoken of as *rice bodies* or *melon-seed bodies*. This condition is well shown in the accompanying illustration (Fig. II).



Fig. II—Specimen sectioned showing melon-seed bodies.

**Remarks:** It must not be forgotten that obscure disabilities about the shoulder may often be traced to inflammation of this bursa resulting in calcareous deposits in the bursa.

W. M. Brickner (*Amer. Jour. Med. Sci.*, March, 1915) has shown that in obscure pain and functional disability of the shoulder joint, what has previously been ascribed to rheumatism, has a real pathologic iden-

tity in the form of calcareous deposits in the bursa, the result of toxic irritation, and that these cases can be cured by excision of the entire bursa. These old-time "rheumatic" shoulders should all be X-rayed and if the findings are positive the bursa should be excised.

Thus surgery is solving in a rational way some of the problems which have for so many years remained hidden beneath the cloak of "rheumatism."

#### Congenital Club Foot.

**History:** Patient, boy, five months old, enters hospital because of a deformity of the feet. The mother has noticed since birth that the child's feet were not in normal relation to the leg—the feet are rolled inward so that the inner surface of the foot is directed upward. (Fig. III).



Fig. III—Note that the foot is rolled inward so that the inner surface of the foot is directed upward.

**Comment:** Club foot is one of the commonest congenital deformities; it occurs more frequently in boys, and usually affects both sides. The etiology of this deformity is variously explained as the result of vicious attitudes during intrauterine life, or as the result of faulty development of the foot. We know that *in utero* the feet are placed against each other by their soles and in this supinated position most children are born. The extreme of this position would give club foot. (Fig. IV).



Fig. IV—Congenital Club-Foot.

Furthermore, heredity seems to play some part as a predisposing factor, since the deformity has been noted in the parents and several children of the same family, while some authors have found club foot much more frequent in children born of consanguineous marriages than among others. We know that this deformity occurs in company with other defects, such as hydro-

cephalus and spina bifida, and that the specific cause of these malformations is as yet unknown.

It must be remembered that if neglected *the primary positional defect is only the first step in a series of complicated pathological changes involving muscles, ligaments, fascia and bone.* In other words, a club foot untreated never tends toward spontaneous cure, but toward obstinate malformation. Under modern treatment a cure may be expected in children and an improvement promised in adult cases.

**Treatment:** Whatever procedure is chosen it must be clearly understood that there are two distinct deformities to be corrected: (a) correction of the varus position; (b) correction of the equinus position, and the deformity should receive attention in the order given. While the methods of correction vary, the purpose is the same; reduction of the deformity and retention in the corrected position until the cure is permanent.

Our rule in the management of these cases is as follows: *If persistent massage gives no results at the end of five months, or if the case is a child of over five months who has not been previously treated—forcible straightening under ether is indicated to place the foot at once in a normal position so that as the child walks he becomes an active agent in the corrective process.*

**Operation:** You will note that the foot seems to be rolled up on the inner side of leg; the corrective process is one of unrolling the foot and molding it into a corrected position.

While the child is under anaesthesia we gently manipulate the foot, stretching the contracted structures until the foot is perfectly flexible. You will note that the foot is now freely moveable in every direction save one—there is still a tendency toward the equinus position due to contraction of the tendo achilles. This we correct by doing a subcutaneous tenotomy.

While this is a simple procedure, two precautions should be observed; (a) strict aseptic methods; (b) care should be exercised not to wound *the posterior tibial vessels and nerve which lie on the inner side of the tendon* and are separated by a sufficient interval to insure their safety.

You will note that we introduce the knife on the internal side, passing flatwise between the skin and tendon, the sharp edge of the blade is then turned toward the tendon, the foot flexed to put the tendon on tension, and the tendon carefully divided from without in. We can feel the tendon giving way as the ends separate. The wound is dressed with aseptic gauze.

The foot is now in a perfectly flaccid condition, freely moveable in all directions. While it is held in an over corrected position a plaster cast is applied extending from the toes to the thigh.

**After-Treatment:** *Failures and imperfect results are caused more by incomplete after-treatment than by imperfect operation.*

The cast should be removed at the end of the fourth week, the foot thoroughly stretched and a second cast applied. The patient should be encouraged to walk with the cast. When the cast is finally removed, some form of walking shoe is employed until the bony structures are molded into permanent relationship.

**Remarks:** The treatment of congenital club foot should begin as early as possible. Just as soon as the child's nutritional status is established—at the end of the second or third week—begin manipulation and massage. It must be remembered that the foot grows rapidly during the first months of life and if the growth

can be directed in a normal direction during this period much can be accomplished in the way of correction. As Willard observes, every case of club foot could be cured with good functional motion if the member could be held in the corrected position by a human hand for six months.

This treatment can be carried out by an intelligent nurse under the direction of the physician. She should be instructed to gently manipulate the foot several times a day by unrolling it and holding it in a corrected position as far as the comfort of the child will permit; with this should be combined massage of the weakened muscles. When the contracted muscles and ligaments have been sufficiently stretched so that the foot is easily held in the corrected position it may be retained by a slight plaster-of-paris cast reaching above the knee and renewed every two or three weeks.

This treatment persistently followed will succeed in many cases in so reducing the deformity that the child will be able to place the sole squarely on the floor when it begins to walk. Walking on a deformed foot must not be permitted, since by this means a moderate deformity will be converted into an inveterate one.

394 Clinton Avenue.

#### CONCERNING HEREDITY.

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That a man inherits mental as he does bodily qualities like those of his father or mother is obvious; it is obvious, too, that he displays qualities which his parents did not possess in the same form. There is production in addition to reproduction, descent of character with modification, the process involving either an increase or a decrease of like qualities, or an apparent neutralization or cancelling of qualities, or the production of new qualities which, although new, are nevertheless products of old qualities. Certain stable forms or patterns of the mental organization—mental compositions or configurations, so to speak—presumably pass without change in the transmission, while other mental forms of structure, being less stable in constitution, undergo decomposition in the vicissitudes of descent to enter into new forms and thus to originate variations. With mental forms, as with such forms of bodily movement as attitude, gait, gesture, facial expression, some are distinctly parental in character, others different, whether superior or inferior.

The variations are sometimes notable reproductions of qualities which, although not parental, are nevertheless ancestral; memories, perhaps, of a grandfather or grandmother or of some more remote ancestor. They may then be said to be latent, or more correctly potential, in the immediate ancestors who do not exhibit them. There is an evident tendency of mental forms in a family to revert to old and stable combinations—to what might be called the stock-forms, now called by Mendelians the dominant characters. In the line of human descent, notwithstanding the frequent introduction of new elements and possibilities of new combinations by every marriage, the stabler stock-forms from time to time meet with the conditions favorable to their reproduction and recur in successive generations. The popular saying in reference to a vicious person that he comes from a bad stock, which is supposed to explain and to some extent excuse his vices and wrongful acts, is an instinctive acknowledgment of this law of reversion. It is, in reality, only a particular in-



stance of the constant tendency of matter coerced into special and complex developments to revert to more simple and stable states, although Mendelians might not admit the accuracy of this assertion.

As the graftings into the family stock of different mental qualities from generation to generation by succeeding marriages tend to produce different strains of thought, feeling and doing, these in turn may meet with conditions favorable to the composition of new and more special forms of mental organization. They become, then, inward variations, new starts, from which in due course proceed outward inventions in science, industry, art, etc. Similarly, it happens that vice can be bred out of a family and virtue bred into it by selective breeding through generations, as vice may conversely be bred into a family and virtue bred out of it when the course of compositions goes the wrong way of degeneration instead of the right way of development.

In the changes and chances of mental composition, it happened that parents of no remarkable distinction produced William Shakespeare; and in other instances men of genius have come from family stocks of no extraordinary mark. There was manifestly in such cases a particularly happy combination of elements in the product by which fit external conditions luckily co-operating, the law of organic development from the more simple and general to the more complex and special was eminently fulfilled. For genius is the outcome of that principle of development in the most special and complex organic structure known to man—the human brain. Such a well-endowed brain as Shakespeare possessed must not, however, be regarded as a mysterious special creation, a freak of nature, something which nature had never brought forth before and could never do again. On the contrary, it may be assumed that many minds with capacity equal to that of Shakespeare have been produced both in England and the United States, but not having the fortune to light on the exact time and conditions propitious to their perfect development, never grew into such conspicuous eminence as to be considered quasi-divine and to have wonderful inspiration discovered in their poorest as well as in their best performances.

Popular opinion is said to hold that a man of genius or other person of eminent distinction almost invariably owes his superior qualities to his mother. This belief is not always correct. A man of genius may, it is true, have had a mother of good mental quality, but it is often true that, like Alexander the Great, and other notable men, he had a father who was well endowed mentally. It is not so much the possession of extraordinary mental qualities inherited either from father or mother as the happy combination of sound stocks of good quality which results in the excellent mental constitution of the offspring—the happy and harmonious combination perhaps of the good intellectual elements of the one with the good affective elements of the other. Without doubt the properties of germ-elements and their laws of combination are as definite as, although vastly more complex than, the properties of chemical elements and their laws of combination; and the products may be good or bad. To produce a genius by the union of two idiots would be a vain endeavor, because the potential mental elements are wanting in their germ-plasms. But a genius may come from the union of two illiterate persons who, although uncultured and undeveloped mentally themselves, proceed from a sound stock and possess brains of good power and quality. For the present, the exquisitely fine laws of germinal combinations are inscrutable, and they are likely to remain unknown until an exact knowledge of

organic physics and chemistry have laid the positive basis of a science of human nature dealing not with speculations and words, but with the facts of individual character and the effects of combinations of characters in breeding. In the meantime, many altars might rightly be raised to fortune by the fortunate, for sometimes an unfortunate child of a family, by what seems to be mysterious chance, inherits the bad qualities, and a fortunate child the good qualities of a parental stock, and later either degenerates or develops in life.

The great delicacy and extreme importance of the reproductive act are overlooked by viewing it in the gross. In it may lie to a considerable extent the predestination of the progeny, for the male and female germs which then blend in union contain the elements and properties of the original germ-plasm which has passed through a long line of ancestors. As these male and female germs may suit well or ill for composition, or hardly suit at all, why should we wonder at a discordant or deformed product, or no product at all from the repugnant union of constitutional antipathies? Further, the reproductive act itself is not merely a gross and animal function which may be done well or ill; certainly it is not when it is the union of love as it aspires to be in man. At its best it is the perfect harmony of the motions and moods of two minds and bodies, summing up in itself the motions, as the germs do the qualities of their elements. With all our long experience on earth and our many diligent researches into the relations of mind and body, we have little better understanding now of the requisite qualities in two individuals for the most successful reproduction of the race than our primeval forefathers had. We do not know how far there should be unlikeness rather than likeness of qualities for the most perfect infant; we cannot predict a single feature, or even the sex of the offspring.

To obtain the best mental product in the offspring, the probability is that the affective element of the parental structure, the strength and quality of feeling, is more important than the purely intellectual element. For as feeling is the expression in mind of the essential nature testifying to the stock-quality, it appears to fuse and weld the elements in construction, while the intellect, being means and instrument, is apt to be critical and destructive. If good parental feeling is not the main factor in the production of good progeny, there can be little doubt that bad and perverse parental feeling is a very effective cause of idiopathic insanity, moral weakness, and vicious disposition in the offspring. Indeed, it is almost as efficient a cause of degeneracy as actual mental derangement in the parent. Superior intellect, without the necessary proper feeling, does not serve well in the highest works of mind, whatever it may do in the baser functions of life. In fact, good feeling may do more with a comparatively simple intellectual instrument than inferior feeling will do with a complex instrument. Other things being equal, the size of the brain may be of some importance; but a well-toned, well-tuned brain, though of moderate size, will sometimes produce greater activity and finer melody of thought than a big brain which is less efficiently equipped in proportion.

To have inherited well mentally is perhaps to have inherited excellent qualities from one's mother simply because the affective element usually predominates in the female sex. But it may happen that the affective qualities are inherited from the father, if not immediately and evidently, certainly in intermediate and occult ways from the ancestral element in him—from the woman latent in the man—for no individual is ex-

clusively or absolutely man or woman. In the mind as in the body of every man and woman there exists the rudiment of that which is fully developed in the other sex. The male nature contains something of the female qualities, and the female nature something of the male. If this were not so, how could a daughter ever reproduce the features, bodily or mental, of her father's mother, or the son those of his mother's father? In the progress of organic development a division of labor has been made for fertilization by the separation of bodies which appear to yearn to again be reunited in the reproductive act. But the specialization has not entailed an absolute separation of qualities; the male human body has not dispossessed itself even of such a purposeless appendage of its female nature as rudimentary nipples.

As the male or female nature can only be expected to show visibly its hereditary qualities at the particular seasons of their natural development, maturity, and decline in the individual, their absence before that time cannot count against their existence. The male who inherits sexual mental qualities from his female parent and the female who inherits such qualities from her male parent will neither exhibit them, though they are latent, until the seasonal period of their development, nor exhibit the special bodily or mental qualities of a parent of the same sex until that crisis. As heredity is the memory of ancestral function, obviously the function can be remembered only when it awakens into action. Then it is that one sees with surprise the predominance of the feminine qualities of mind in the man, and of the masculine qualities of mind in the woman. As the individual from birth to death is never fixed but is always changing, an ancestral quality may leap into evidence at any moment. A person may reveal plainly, perhaps for the first time, a parental feature in the process of dying, just as a facial expression soon after death may disclose a remarkable parental likeness which it had not shown during life. In this case, however, the mould of the firm ancestral structure is clearly defined, because it is no longer concealed, effaced or defaced by the play of the features in their variations during life, which might be memories of the mother or mixed memories, not always congruous perhaps, of father and mother, while the mould represented the father. Without doubt, an intelligent and correctly instructed person who observed closely the different expressions of his own features at different times, and in different moods and circumstances might discover the memories of a number of ancestors provided he knew their features exactly. He might perhaps perceive once or twice only during his life under special conditions of health or of stress, and be surprised by a special expression which he could not even imitate however much he might try, but which was clearly an unexpected ancestral reminiscence.

If all his ancestors are contained in the individual, as the structure of man's body indicates, he need not wonder at nor seek excuses for impulses which spring up unexpectedly in him from time to time, and for which he is quite unable to account. Man is such a wonderful and inscrutable complex that the small part of him which rises into consciousness is only a partial revelation of the multitudinous subtle activities continually occurring below its level and constituting the true forces of his character. Let him take comfort in all his aberrations and inconsistencies; in fulfilling the strangest impulse he is in all probability living some ancestor or some ancestral quality latent in him. Has he a thoroughly well constituted mind-substance below the level of consciousness as a consequence of a

good ancestral stock? It is the virtues of that stock which support him if he is virtuous, their counsels which instruct him if he is wise, their good feelings which inspire him if he is honest. In no case can he exactly repeat his forefathers, for not only does he contain some different compositions of elements, but as his brain is brought into relation with the circumstances of a new and different environment, he cannot for that reason act instinctively and automatically, but must make new adjustments. The result is that man is not, as he otherwise would be, an instinctive and intuitive being exactly adapted to his medium, but that a reflection of nerve-currents takes place—that is, a mental reflection with its consequent consciousness. He represents one of many varieties of a fundamental type.

As mental compositions may be complete and stable, or imperfect and unstable, according to the qualities of the combining parental strains, it happens that all sorts of minds, sound and stable, strong and wise, erratic and unstable, weak and unsound are generated. Nothing can be more incorrect than to speak of mind as if it were always of equal strength and quality, for nature makes as many abortive and imperfect products in its mental as in its other works. A little-noticed example of mental instability occurs when the paternal and maternal elements are mixed rather than completely combined in the individual, retaining their respective characters instead of blending and losing them in a new product with different and, perhaps, superior qualities, so that sometimes the one and sometimes the other nature predominates in the feelings and doings, whether at different seasons or at different junctures of life. Such a person is not a firm compound whole, not a consistent entity, but is a mixture or binding together rather than a vital composition of organic factors, and representing at one period his father and at another his mother, he surprises not only others, but also himself, perhaps, by his different explosions of character. It would seem as if there had not been in generation the requisite antagonisms and affinities of elements by which, like positive and negative electricity, they are reciprocally attracted and blended in union. There is little doubt that the want of a thorough unity of being, a perfect mental integrity, is the cause of vacillations, inconsistencies, worries, self-criticisms, and self-consciousness to the ill-compounded mortal, and likely to hinder him, however great his ability, from reaching great mental eminence.

No mortal, however, is thoroughly consistent. Every one contains so many ancestors and such a variety of ancestral experience in his make-up, and is subject through life to so many and diverse influences in the sundry and manifold changes of circumstances that it is impossible to say what latent factor of so complex a being may be called into action. The great majority of ordinarily-educated people are habitually inconsistent; they believe one day what they disbelieve another day, without any other reason than a change of mood. Some persons tranquilly hold side by side inconsistent or actually contradictory beliefs in their minds, and are so inconstant in feeling and conduct that no one, not even themselves, can be sure to-day what they will say or do tomorrow. There is nothing remarkable in that; what is remarkable is that any one who has studied the subject should consider the condition remarkable, and should expect consistency in character, as if the individual was a constant entity, an end in himself, not merely a passing means to a far-off end, or no end at all in a process of things which consistencies and inconsistencies alike fulfill. To the whole it matters not



how the forces of human being and doing are distributed individually, nor what the individual feels, thinks or suffers, so long as they do their work as a body. It matters little to human society, which merely uses the individual in its service, and abounds in inconsistencies and misjudgments, often condemning the cynic who is actually tender-hearted and sincere, while it praises tender-heartedness and sincerity in the abstract, and belauding the impassioned trader in philanthropy who is actually vain, selfish and hypocritical, while it condemns hypocrisy and selfishness in the abstract.

The factors of most importance in the reproductive union of two minds being the basic qualities of the stock, not the outwardly manifest qualities displayed by either of them, the deep, sub-conscious mind-substance, not its conscious manifestations, it is not surprising that genius is not inherited—the genius, that is, which, using up the vital sap, blossoms in full flower, and that genius proceeds sometimes from the well-structured and rich-sapped stock which, having made no explicit show, has not exhausted itself in flowering many times. The obscure father or grandfather has been a person of larger innate capacity, of greater potentiality mentally, than his eminent son or grandson who flowered brilliantly at the proper season and in favorable conditions. As the accomplishments of a particular mind are individual developments, they can be no more inherited than the athletic accomplishments of a particular body; they tend rather to spend the capital of funded force in the stock, which is then unfit to produce well again in the direct line, fit only, perhaps, if not finally exhausted, to produce another genius through another branch after a long spell of quiet, self-denying, humbly heroic growth.

### INDUCED LEUCOCYTOSIS AS AN AID TO SURGERY.

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The attainment of leucocytosis in non-septic or in septic pathological conditions is much to be desired, increasing, as it does, the recuperative faculty of the body cells and their fighting power against disease. Leucocytosis and hyperleucocytosis have been reported in medical literature as accessory features resulting from a course of treatment with digitalis. It occurred to the author that this function of digitalis, if it could be depended on, might prove of value in the treatment of patients who, though requiring operation, were in a physical condition which seemed to contra-indicate operative procedure until a higher resistancy had been established.

I have had experiences in which desirable improvement in condition followed the administration of digitalis in certain operative conditions, with or without primary heart involvement, in which prolonged observation and building up of the system were necessary prior to operation. Having, moreover, experienced in such cases the favorable influence on the heart without interference with any other organ, I felt justified in embarking on a series of experiments to determine how the best effect could be obtained and to which physiological function this effect was due.

Sadler<sup>1</sup>, Thistowitsch<sup>2</sup> and Schlesinger<sup>3</sup> showed that in favorable pneumonia cases a hyperleucocytosis following the use of digitalis was observed, while in cases with an unfavorable ending a hypoleucocytosis prevails; all these reports indicate that it is in all probability correct to ascribe the favorable influence of digi-

talís before and after operation, not exclusively to its well known effect upon the heart muscle, but also to its constant development of leucocytosis.

The earliest available reports on the effect of digitalis on leucocytosis I have found are those of Nägeli-Ackerblom<sup>4</sup>. He reports that in the case of a rabbit an injection of 0.2 gram folia digitalis in the form of infusion produced in 24 hours an increase of the white leucocytes to twice the original count. He obtained a still more pronounced leucocytosis following the injection of 1 gram extract of digitalis leaves into a healthy man. The leucocytosis produced by digitalis is not always in proportion to the dose given, due, doubtless, to the increase of blood-pressure raising an obstacle to the circulation of the blood and so diminishing the development of leucocytosis—an explanation which is substantiated by the experimental results of Winogradoff.<sup>5</sup>

Herzig<sup>6</sup> followed up Nägeli-Ackerblom's work, but used only the pure active principles of digitalis in his experiments; the effects of injections of digalen on rabbits were studied in six cases with the following results: Leucocytosis resulted in all cases but one, and in this case the rabbit case had already a count of 20,000 leucocytes before the injection. The strongest leucocytosis was 12,000 in 24 hours after the injection. A primary hypoleucocytosis, such as happens with many substances whose after-effect is a late hyperleucocytosis, did not occur in any one case. It is important to note that in most of the cases the polynuclei participated relatively more than the lymphocytes in the hyperleucocytosis.

I would like to mention here that the fact that the doses of digalen were apparently uniformly well borne by the rabbits used in Herzig's experiments seems to argue for the substitution of the rabbit for the frog—in physiological testing of digitalis preparations—as the latter, like all cold-blooded animals, is not suitable for the study of processes pertaining to the circulation. The many difficulties which attend the experimental determination of the co-efficient of a digitalis preparation are well known, and only recently these have been well pointed out by Hatcher<sup>7</sup>, who favors the cat as test animal, by Haskell<sup>8</sup>, who prefers the guinea pig, by Baker<sup>9</sup> and others.\*

Franchetti<sup>10</sup> states that he is in accordance with other authors in having observed a strong increase of leucocytes, mostly of the polynuclear type, following the exhibition of digitalis. He computes the increase as averaging 1,200 to 1,800, in many cases it reached 3,000 to 4,000 and even as high as 10,000. He reports 22 cases and found that an injection of 1 c.c. digalen produced a considerable increase in the number of leucocytes in from 2½ to 8 hours; the duration of the leucocytosis varied on the average from 15 to 20 hours.

Mirano<sup>11</sup> examined 12 pneumonia cases for leucocytosis after injection of digalen and reports on six of them in detail. In all of them he found a marked increase of the leucocytes 7 to 8 hours after the injection.

The following tables which deal with the first series of my own experiences give the data of 12 cases; in 9 of them digalen was administered orally, over a period of time which did not exceed four weeks; in 3 of the cases described, digalen (1 c.c.) was given intravenously, in one of these (Case No. 10) the second count

\*Roth (Hygienic Laboratory Bulletin, No. 102, Feb., 1916,) referring to Baker's paper describes the failings of the frog method in a graphic manner: "frogs that were kept in the light absorbed better than those kept in the dark and at higher temperatures absorption occurred more readily. Dry frogs absorbed less readily than controls which were kept in wet cages."



was made one hour after the injection. In 8 of the cases the patients were under treatment for ailments which seemed to contra-indicate the exhibition of an anesthetic until after the results produced in them by the digitalis treatment; case 9 had a purulent deep abscess on the hand with necrosis of bone; case 5 had a serious compensated mitral stenosis.

	Pulse	Total Leuco- cytes	—Percentage of— Poly- nuclei	L	S	E
<b>CASE 1. (C. N. 1729.)</b>						
Female; age 43.						
Excision of rectum.						
Sept. 10, 1915.....	85	8200	72	18	7	3
Sept. 16, .....	85	9400	71	16	10	3
Sept. 24, .....	80	11400	77	15	7	1
Oct. 2, .....	85	13200	76	17	4	3
Oct. 10, .....	80	12800	77	18	4	1
<b>CASE 2. (C. N. 1431.)</b>						
Female; age 29.						
Hemorrhoids.						
Sept. 18, .....	75	7440	75	23	2	0
Sept. 24, .....	80	8100	79	17	3	1
Sept. 30, .....	80	7800	76	20	2	2
Oct. 5, .....	85	12350	80	15	4	1
Oct. 12, .....	75	12600	81	16	2	1
<b>CASE 3. (C. N. 1748.)</b>						
Female; age 36.						
Multiple perineal fistulae and necrosis of coccyx.						
Sept. 10, .....	90	9200	73	19	7	1
Sept. 18, .....	85	9800	74	22	2	2
Sept. 24, .....	90	11450	75	20	3	2
Sept. 30, .....	90	11700	75	18	6	1
<b>CASE 4. (C. N. 1659.)</b>						
Male; age 48.						
Hemorrhoids and prostatectomy.						
Sept. 17, .....	85	6700	76	19	2	3
Sept. 25, .....	85	9000	75	21	3	1
Sept. 30, .....	85	8700	76	20	3	1
<b>CASE 5. (C. N. 1935.)</b>						
Male; age 46.						
Appendectomy (serious compensated mitral stenosis).						
Sept. 17, .....	90	8400	72	22	4	2
Sept. 26, .....	85	8600	73	18	8	1
Oct. 2, .....	90	8500	75	23	2	0
Oct. 10, .....	90	9100	75	22	1	2
<b>CASE 6. (C. N. 1887.)</b>						
Male; age 53.						
Mitral stenosis.						
Sept. 10, .....	80	7400	68	26	5	1
Sept. 17, .....	80	7600	70	24	4	2
Sept. 22, .....	85	8000	72	17	9	2
Sept. 30, .....	80	10100	72	18	8	2
<b>CASE 7. (C. N. 1841.)</b>						
Male; age 62.						
Epithelioma at base of tongue.						
Sept. 21, .....	90	8200	71	19	6	4
Sept. 26, .....	90	8300	71	22	5	2
Oct. 1, .....	85	8200	70	25	4	1
<b>CASE 8. (C. N. 1689.)</b>						
Male; age 43.						
Inguinal hernia.						
Sept. 10, .....	90	6400	74	24	1	1
Sept. 17, .....	90	7200	73	21	4	2
<b>CASE 9. (C. N. 1544.)</b>						
Male; age 52.						
Purulent deep abscess on hand and necrosis of bone.						
Sept. 28, .....	80	11200	76	20	1	3
Oct. 3, .....	80	11300	75	18	3	4
Oct. 10, .....	85	11200	76	17	4	3
<b>CASE 10. (C. N. 1737.)</b>						
Female; age 29.						
Orificial plastic operation.						
Oct. 10—						
11 A. M. ....	90	6200	72	22	4	2
12 A. M. ....	90	9200	74	25	5	0

**CASE 11. (C. N. 1920.)** Female; age 25. Laparotomy.

While under observation for three weeks prior to operation the heart ran from 60 to 65 and the leucocyte count was comparatively low (4700); intravenous injections of 1 c.c. digalen, night and morning for three days, brought the heart action to 82 with a simultaneous increase of the leucocyte count to 12000. It is noteworthy that the standardizing action of digalen on the circulation in this case brought the pulse rate up to 82.

**CASE 12. (C. N. 1805.)** Laparotomy.

Female; age 70. Pulse 120 and leucocyte count 8000. Kept under observation for two weeks and then digalen 1 c.c. night and morning was administered intravenously for three days. This brought the pulse down to 90 and the leucocyte count increased to 15000. On the fourth day after an injection of 1 c.c. digalen night and morning the pulse came down to 72 and compensation has remained established during three months' subsequent observation.

All the above were average cases with nervous debilitated conditions resulting from the diseases from which they were suffering and for which they were to be operated on if possible.

The increases of the number of leucocytes observed in the above cases were therefore as follows:

#### Oral Administration.

CASE.	Time.	TOTAL LEUCOCYTES		POLYNUCLEAR LEUCOCYTES	
		Percentage	Increase of	Percentage	Increase of
		leucocytes.	leucocytes.	polynuclei.	polynuclei.
1.	After 4 weeks	4600	56%	3950	61%
2.	After 3 weeks	5160	69%	4620	82%
3.	After 3 weeks	2500	27%	1875	28%
4.	After 2 weeks	2000	29%	1520	30%
5.	After 3 weeks	700	8%	770	12%
6.	After 3 weeks	2700	36%	2240	45%
8.	After 8 days	800	12%	520	11%

#### INTRAVENOUS INJECTION.

10.	After 1 hour	3000	48%	2340	52%
11.	After 3 days	7300	155%	5850	176%
12.	After 3 days	7000	87%	6150	125%

There was neither increase nor decrease of the leucocytes in case 7 nor in case 9 after two weeks' medication; in the latter case there was, though, from the beginning a very high leucocyte count. In most of the cases the increase of the number of leucocytes is unmistakable; a very marked increase was observed in those cases in which the drug was given intravenously and it is in this direction that I intend to undertake further experiments for therapeutical purposes.

In the cases in which the drug was given per os, it was given in doses of 1 to 2 cc. per day and there is no doubt that a condition of equilibrium between intake and excretion was soon established and as a result no further startling reaction could be expected.

The observed increases of the polynuclear-neutrophil leucocytes established beyond doubt that we had actually dealt with a true hyperleucocytosis.

We know that an increase of the absolute number of white cells over the normal per cc. means a leucocytosis. If there is an absolute leucocytosis all cells, theoretically, may be increased uniformly. In this case there would be no change in the percentage of the different types of leucocytes; mostly, however, the general increase is not uniform, but involves a heterogeneous percental increase. The condition most frequently observed is the percental increase of the polynuclear-neutrophil leucocytes; that condition is found in the physiological digestion ("Abbau") of albumin, as partial symptom of the general and absolute secondary neutrophil-hyperleucocytosis in its proper sense, as reaction after nucleic acid injection, also in pregnancy, in pneumonia and in erysipelas, etc. In the last instance every leucocytosis—this functional and plastic process in the tissue—is of a catalytic-physiological, irritative nature, a fact that is borne out through the causation of leucocytosis by ethereal oils, terpenes and certain alkaloids, by saponin, hydroxylamine, adrenalin, lactic

acid and other substances which produce such irritation. From time to time it has been suggested that the leucocytes may contain or produce substances that neutralize toxic microbic products, but that such is the case has not been demonstrated clearly<sup>12</sup>. Be that as it may, it is safe to regard functional leucocytosis as the expression of the biological protection-and-defense-reaction of the infected or intoxicated organism. It would appear, therefore, from the instances of induced hyperleucocytosis recorded, that in the exhibition of digitalis the well known effect on the heart muscle is in many conditions reinforced by an important catalytic action on the circulatory fluid.

This is, so far as I am aware, the first instance in which this subject has been studied from the point of view of the surgeon as a preparatory operative procedure; the results obtained so far justify the work done and suggest that the field is a fruitful one for wider investigation.

<sup>1</sup>Sadler: Klinische Untersuchungen über die Zahl der Korpuskularelemente des Blutes. Fortschritte der Medizin, 1892.

<sup>2</sup>Thistowitsch: Etude de la pneumonie fibrineuse. Annales de l'Institut Pasteur, Vol. V.

<sup>3</sup>Schlesinger: Die Leukozytose bei experimenteller Infektion. Zeitschrift für Hygiene, Bd. 35.

<sup>4</sup>Nageli-Ackerblom: Zur Behandlung der Pneumonie croupose mit Digitalis. Zentralblatt f. innere Medizin, Bd. 16.

<sup>5</sup>Wingrodoff: Materialien zur Lehre über den Einfluss der Veränderung des arteriellen Blutdruckes auf die Morphologie des Blutes.

<sup>6</sup>Herzig: Archiv. für experimentelle Pathologie und Pharmakologie.

<sup>7</sup>Hatcher: Druggists Circular, 1914, Vol. 58, No. 10.

<sup>8</sup>Haskell: American Journal of Pharmacy, January, 1914.

<sup>9</sup>Baker: Some factors in drug absorption in frogs. Jour. Am. Phar. Assn., Vol. 4, 1915, p. 443.

<sup>10</sup>Franchetti: Ricerche sulla leucocitose. La Clinica Medica Italiana, Feb. 1911, No. 2.

<sup>11</sup>Mirano: Digalene e leucocitose. Reforma Medica, 1907, No. 23.

<sup>12</sup>Editorial: J. A. M. A., December 12, 1908. The Anti-Infectious Power of Leucocytic Extracts.

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# IN A MILITARY HOSPITAL.

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It was all on account of a tiny "cherry-stone," not the kind that is popularly supposed to have an affinity for the appendix (I never found but one aberrant seed in that by-path of the tortuous lane), but a harmless little clam. "So young and so untender!" It transformed a dignified, self-satisfied person, resplendent in blue and gold into a writhing wretch in pyjamas, oblivious of gilt and glory. Too much Washington hospitality with the thermometer at 96° F. in the shade! "All flesh is grass." One can never analyze coldly this surprising jumble of fauna and flora, for it must be experienced. A good dose of ptomaine brings it home to the skeptic more forcibly than a dozen sermons on this text.

I could not have selected (though it was not a case of "natural" selection) a more favorable time for myself and my medico-military friends. They had me entirely in their power and I could not resist, if I had had the strength. It was a brief agony—only two days—but worth the discomfort. What illness is *not* worth more than all the pain? Does it not reveal the real worth and the kind hearts of our brothers in the profession, which we had only dimly realized before? And, better still, does it not reveal to us one's real self, his inherent strength and weakness? Catch a doctor in the throes of the grippe and you find out what a baby he is and how he kicks at taking his own medicine. One can adjust himself to a long, enforced confinement (*not* obstetrical), but to be suddenly knocked out in the midst of one's pride in his health and strength is the most searching test of all. Your belly-ache is the true self-revealer—to an X-scientist, as well as to an ordinary mortal.

Be that as it may, I surrendered gracefully. The most eminent pathologist in the medical corps, on the eve of sailing for a distant station, administered the orthodox dose of salts, with the same hand that prepares the anti-typhoid serum for the army. Two other majors continued the treatment and, "as a lamb is led to the slaughter," I made no protest when they ordered me to the hospital, which bears the name of Walter Reed—both the pride of the corps. I was "transferred" in state; a captain acted as my chauffeur, while his orderly kept his eagle eye upon me to see that I did not try to escape. We arrived. A trim attendant in white duck put me to bed and my individuality was lost in a number. Far away I heard the dying notes of the bugle sounding "taps" and I was left to my repose. Repose! As if the major's salts would permit quiet slumber! On the contrary it was a busy night, so that when another orderly (apparently a representative of the Goddess Cloacina) asked the next morning, "How many?" I feebly but proudly responded, "Six," having broken the record according to his special "Book of the Dead," in which it was carefully noted.

It was a "white" night, though why this term should be applied to those of another color is not clear. Tossing to and fro on my hard cot, full of aches and pains, with my mind beset with phantoms of the past—literary scraps from Maupassant to the Scriptures—pathetically weak and helpless, I could only murmur: "Give me some drink, Titinius (or, rather, orderly), as a sick girl." Will the long, hot night ever end? I catch the first faint breath of "incense-breathing morn" and note that ever-glorious miracle, the elusive coming of the day—worth all the slow hours of watching. There goes "first call" and I wait for the stirring notes of the reveille, which had so often roused me shivering from my blankets, beneath the shadows of the snow-covered Rockies and in camp and garrison. Now I can picture the hum of the distant camp, the hasty, informal toilet, the welcome mess-call: "Come and get it!"

This reminds me of the fact that I need a bath. Enter a pretty nurse, at least I suppose that this conventional term applies to all nurses (of whom at least six flitted before my disordered vision during the day), although their physical charms are not appreciated until the stage of convalescence—*after* the period when "the devil a monk would be."

Question: "May I have a bath?"

Reply (stern and severe): "I shall ask the officer of the day." I realize that I am under military control and meekly submit.

Enter officer of the day, in service uniform, a youngster some thirty years my junior. "Please, can I have a bath?" "I do not think that it would be advisable in your present weak condition." "Very good, sir, you know best."

Am I, the boss of hospitals at home, to submit so tamely to the dictation of a kid? "It is an order." That magic formula explains. Gee, whiz! if I could only "command" a hospital for twenty-four hours as they do in the army! Wouldn't I cease to bow meekly before the two haughty S's—superintendent and supervising nurse!

To make a long story short—I was allowed to wash my face. Enter another p. n. with toast and tea, with which I toy idly to please her.

"The major is making his rounds and will see you"; and soon after my big, genial friend, just back from a foreign station, enters with his cheery smile and warm hand-clasp. Two nights ago we met on an equality at



a function, both in uniform. Now all is changed. He is in uniform, while I am in pyjamas; he commands, I obey. But it is the "way of the army," and I am content. He goes over me in the most painstaking way—your medical officer is nothing if not thorough—and assures me that I am not as near dissolution as I had feared.

He goes away. Enter a new figure in white, a fine, manly young fellow, with the insignia of ward-master. "Will the lieutenant have anything?" he asks in the formal phrase prescribed by Regulations and gives me the morning papers. How unreal seem the most thrilling events in the outside world when we are sick and miserable! How few people (even doctors) realize that there are times when the patient's touch with worldly matters is so slight that the breezy, sympathetic friends irritates, rather than cheers, by his well-meant attempts to interest us in things which interest him. Doctors ought to study the moods of their patients and time their visits and conversation accordingly. To paraphrase the thought of the Wise One: "There is a time to 'chin' and a time to shut up."

My young friend seemed instinctively to know this and I recognized at once that he was a fine type. Short as was our acquaintance (I did not learn his name), I shall never forget that manly soldier. He had fought in the Boer War and, from a few words which he dropped, I inferred that he had "done his bit" in a desperate charge. If I had not been so weak and shiftless, to what an interesting personal history I might have listened! For I know the way to the soldier's heart. It is a secret, but it is worth knowing, for only when he trusts you will he tell you, like a child, all his troubles and aspirations. I knew a boy, just from the Point—but "that is another story." "God bless him," confessed an old grizzled sergeant to me, "we'd follow Lieut. — to hell if he led the way." Yes, that is the secret, and many company commanders never take the trouble to learn it, more's the pity.

The day passed painfully, but not unpleasantly. The major called several times; captains and lieutenants came and went; orderlies, heaps of p. n.'s. One of the latter had been with me in civil (or uncivil) practice. I was a spoiled baby—a guest, rather than a patient. None the less I was "under orders" and accepted my occasional glass of milk with due submission.

Enter my friend, the ward-master. "Would the lieutenant have some ice cream?" You bet your life he would.

Enter the aforesaid officer of the day. "I do not think that it would be advisable." Meek acquiescence.

The hours dragged slowly, punctuated with the familiar bugle calls—"fatigue," "mess," etc.—which my imagination readily translated into the busy scenes of an army post. And then came "retreat," and I pictured myself as standing at attention, while the dear old colors sank slowly downward from their lofty perch.

"Now drowsy tinklings (of dishes) lull the distant fold." "Tattoo" and then the sweet, sad notes of the soldier's good-night—in death, as in life—the call to rest after a day of toil, and to the long sleep that "knows no waking."

Another sleepless night, only enlivened by an act of mutiny, which I confess fearfully, hoping that it may not be entered on my record. About 3 A. M., following an evil custom (which has led to frequent domestic chidings), I stole with stealthy steps (note the unconscious alliteration) through the silent hall, peeped into the rooms where night nurse and orderly

were taking their excusable cat-naps, and made my way with unerring instinct to the ice-box, just as if I had been at home. There was a tempting display, but I played fair and only gorged myself with milk, retreating in good order, chuckling softly as I slipped past the sleepers.

The same lovely dawn, but less appreciated after a second sleepless night. Reveille and with it a rising spirit of insubordination. I had played sick long enough.

"Will the lieutenant have anything?" My trim young friend repeats his formula. "Yes, I want to go home." "It will be necessary to see the major, who makes his rounds at eight o'clock."

Gee! how much red tape, but I can't help myself. He comes at last, I pull myself together, realizing that I have been "some sick," and after various formalities have been complied with, am told that a motor-ambulance will be ready for me at nine.

Then follow grateful leave-takings from my host of friends, male and female, *real* friends, although two days ago we were strangers. I pay my respects for the first time to the old colonel who commands the hospital (alas! since then he met a tragic end) and am whisked away to town at thirty miles an hour by a soldier-chauffeur, with whom I discussed the transport of wounded in the world-war. He was a philosopher, that corporal, and held decided views with regard to euthanasia.

"I believe," he remarked calmly, "that if a case is hopeless, we ought to put the man out of misery. What do you think, lieutenant?" he asked.

It was a poser. I, too, hold certain views, not fit for publication, but I answered diplomatically: "It would not do to apply this principle too generally, though there may be cases in which it would seem to be justifiable. In fact, I remember that once"—here I prudently changed the subject. Doctors do not tell all their grewsome experiences. They might shock ultra-sensitive consciences, such as that of the editor of *Life*.

I reached the station all right and eventually returned to "civil life" rather the worse for wear, but richer in experience and with renewed affection and respect for the U. S. Medical Corps, than whom there are no finer gentlemen—God bless them!

#### SCIENTIFIC RESEARCHES INTO THE CAUSES OF ALCOHOLISM AND INEBRIETY.

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One great fact has been established by accurate laboratory and clinical research, viz., that the physiological action of alcohol on the cell and tissue is that of an anaesthetic and depressant, and not a tonic or stimulant. This has been accepted by the profession generally, and while it revolutionizes the previous theories, explains in some degree why alcohol is so fascinating.

Beyond this, there is a vast range of causes producing alcoholism and inebriety that are practically unknown. All remedial and restorative efforts are based on the theory that alcohol is the special and particular cause of all the degenerations which follow from its use.

Careful studies of individual cases show this to be untrue; also that in many instances alcohol is only a symptom. It may be a complicating drug intensifying unknown conditions that were latent before. It may be a specific poison localizing in certain organs. It is



also cumulative, and associated with the most complex neuroses.

The causes that impel men to drink have never been studied scientifically. The literature up to the present is a confusing mass of theories and opinions unverified.

In this unknown region there are innumerable questions like the following: Why are certain periods of life more favorable for the outbreak of the craze for alcohol than others? Why does the desire to drink break out suddenly in diverse conditions, and then subside from causes inadequate to explain the change? What is the explanation of the exact periodicity of these drink excesses that are as certain as the rise and fall of the tide? What are the causes in surroundings and conditions of living that provoke these paroxysms? Why do men drink after injuries, diseases, shocks, losses, disappointments, business reverses and great successes in life? What degenerations are transmitted from the parents to the children that create susceptibility or immunity to the effects of alcohol? Why are some persons able to drink in so-called moderation for years, and why do others quickly become diseased and die? Why do some men drink in early life, then abstain, and in middle or later life turn to alcohol again and drink until death? Why are some persons susceptible to the contagion of surroundings and companions, while others are immune? What physical and psychical causes produce the drink craze?

These are some of the unknown causes and conditions which have never been studied with scientific exactness. One of the most prominent and widely accepted explanations is the so-called moral cause. Physical conditions are considered results and not causes.

A Research Foundation has recently been organized at Hartford, Conn., for the purpose of making an exact scientific study of these questions. It will be endowed and become a permanent work. Preliminary studies have already begun, and practicing physicians from all parts of the country are appealed to for the records and histories of cases which will be compiled and tabulated for the purpose of determining the laws which control and govern them.

This is the first scientific effort to take up the subjects of alcoholism and inebriety and determine the causes which produce them outside of alcohol. Science has shown that these conditions are governed by exact physical and psychical laws, which if known and understood would indicate the most practical means and measures of relief.

The foundation will be practically a laboratory or clearing house, where persons can come for examination, counsel and advice. To a large class of persons who want something more than pledges, appeals or sanatorium treatment, this will open a new field of means and measures for relief that will be most welcome.

Correspondence is earnestly solicited from the profession.

#### **Iced Normal Salt Solution in Gonococcal Conjunctivitis.**

Edward B. Heckel recommends this local treatment of virulent gonococcal conjunctivitis. Ice-pads have for a long time been used in the treatment of this disease, on the theory that cold would inhibit bacterial growth. In view of this, and on the assumption that gonococci are found only in superficial tissues, he has used iced normal saline solution in a few cases. He believes that it is a specific mode of treatment for virulent gonococcal conjunctivitis. He has found it to be harmless, an effective germicide, easily applied and well borne.—(*Penn Med. Jour.*, 1915.)

#### **THE ORIGIN AND DEVELOPMENT OF THE SOCIETY OF MEDICAL JURISPRUDENCE.\***

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New York.

The past history of the Society of Medical Jurisprudence is secure and speaks for itself, and we are now looking to the future, confident that under the administration and guidance of our honored colleague, Dr. Robertson, the society will continue to increase in usefulness and influence.

If I may on this occasion be pardoned for referring to personal matters, it would be to state that I am at the present time, from the point of continuous service, probably the oldest living active member of the society, having been a member since 1885, during which time I have had the honor to hold successively the three different offices of secretary, treasurer and president for a period extending over twenty years, and even prior to my joining the society I was accustomed from time to time to attend its meetings, so it is only reasonable to assume that I have a fair knowledge of the history and development of the society. I have had the honor and privilege of being personally acquainted with most of the officers and trustees of the society since its organization, and as I look back upon that long line of distinguished names, most of whom were my dear personal friends, and many of whom have gone from us forever, I realize more and more that the present commanding position which the society occupies is largely due to the careful, conscientious and self-denying attention which these officers gave to the advancement of the interests of the society.

While all of the members are aware of the important position which the society now enjoys, I believe that very few of those present are acquainted with the real underlying causes which led to its organization.

Prior to 1883 there existed in the city of New York a society for the study of the problems of medical jurisprudence, but it was felt by some of the more progressive members of the legal and medical professions, among whom may be mentioned Dr. N. E. Brill, a distinguished physician and at the present time the oldest (in point of time) living ex-president of the society; Dr. E. C. Spitzka, Dr. Frank H. Hamilton; Judge Amos G. Hull, William Barnes, Sr.; Col. Henry W. Sackett, Dr. Arthur M. Jacobus, the only living member of the first board of trustees, and others, that the old society as it then existed did not fulfill the requirements demanded by the two professions. It was felt that a virile society should be organized where questions could be discussed in an open forum; that there was need for a society which should be governed by its members and not by one man or a small group of men; there was felt to be a need for a society where the members would have a voice in the disposal of its property, and, above all, there was felt to be a need for a society where the common interests of study and investigation of scientific subjects would foster and develop harmony of interests and a brotherhood in sentiments and feelings between the two professions.

The attainment of the latter object was, I believe, the foundation stone upon which the success of our society was built, for at that time there was, without doubt, a feeling of distrust existing between physicians who in the line of their professional duties were called upon to give medical expert testimony in court and the lawyers who were called upon to examine and cross-ex-

\*Read by the retiring president at the January meeting of the Society in New York, 1916.

amine them. The two professions did not thoroughly understand each other, and were apt to be antagonistic, the result being, in many instances, that when the honest medical expert left the witness stand he felt he had been unnecessarily humiliated by the examining counsel and realized that on account of the lack of scientific knowledge of the subject in controversy on the part of the lawyer who opposed him, and very frequently on the part of the lawyer on his own side of the case, he had been misunderstood by both the court and the jury.

It therefore became more and more evident to both the legal and medical professions that the attainment of a higher standard of medical expert testimony was absolutely necessary, if the two professions were to work in harmony in the solution of scientific medico-legal problems.

That the objects which led to the organization of our society have to a great extent been attained, cannot for a moment be doubted. Owing to the splendid work accomplished by this society during the past thirty-three years, there has grown up and developed between the two professions a much needed harmony of interests and a brotherhood in sentiments and feelings, which result alone would have warranted and justified the organization of the society. No one will deny that the standard of expert medical testimony today has materially improved during the past ten years, and that lawyer and the physician have grown to more fully understand and appreciate one another.

The society has sometimes been criticised by those who have not given the matter careful study and attention, on the ground that very little real constructive legislation has been enacted through its efforts, and it may be that so far as actual legislation is concerned, such criticism is well taken, but it must be borne in mind that it is not the function of the society to directly bring about legislation, but rather by study, scientific investigation and discussion to awaken such an interest among the members of the two professions, the press and the public at large, that the desired result may be brought about by legislation or otherwise as the case may be.

Naturally, the subject which has most frequently come before the society for discussion is that of insanity, which for many years has been studied and investigated from every imaginable point of view, and it is hoped that before long this important and vexing subject will be finally settled to the satisfaction of all concerned.

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antibodies of syphilis, even when they are not present in sufficient amount to give a positive Wassermann. In patients with the initial lesion of syphilis, this reaction is often present when the Wassermann reaction is absent. Any patient having a suspicious sore, and showing this "delayed negative" Wassermann, should be very carefully and repeatedly examined for the presence of the spirocheta pallida. The reaction is also of importance in the tertiary stage, where patients with active lesions of syphilis show thirty-three per cent. of negative Wassermann reactions. As a guide in the treatment of syphilis the "delayed negative" is an indication for more treatment even though the Wassermann is completely negative at the end of two hours in the incubator.—*Journal of Lab. and Clin. Med.*, June, 1916.)

#### Mic-roscopic Examination of the Urine.

(Continued from July Issue.)

The cloudiness of the cells is designated as albuminous when the individual granules are only slightly refractive and soluble in dilute potassium hydrate and acetic acid and insoluble in ether. On the other hand, the granulations of the granule cells which are produced by genuine fatty degeneration, are characterized by their insolubility in potassium hydrate and acetic acid and their solubility in ether and alcohol, blackening in osmic acid and brilliant-red coloration by Sudan III.

The granule cells are particularly numerous, both free and adhering to casts in the large white kidney, less often in other forms of nephritis, and then usually in severe acute inflammation. In this instance their abundant presence is of decidedly unfavorable prognostic significance.

**Renal Casts.**—By these are understood delicate, cylindrical formations of variable length, thickness, and other external appearances. They were found first by Henle (1844) in the urine and in the kidney and described as important accompaniments of renal affections. In addition to the epithelia of the kidney tubes, they occupy a prominent position among the organized sediments in the diagnosis of renal affections. Three varieties usually are distinguished: hyalin, granular and waxy casts, and according to the cellular constituents, epithelial casts, fat-granule casts, blood-casts, etc.

**Hyalin Casts** occur in very variable length (up to from 1 to 2 millimeters) and breadth (from 10 to 50). They are delicate, translucent or transparent, glassy, perfectly homogeneous formations, and usually have a straight or occasionally a slightly tortuous contour, with parallel outlines. They are easily overlooked, but may be rendered distinct by various staining substances, such as iodine, carmin, picric acid, and basic aniline dyes added to the sediment (see Fig. 00). They should be sought for with strongly diminished illumination.

In icterus they present a yellowish-green color. Many kinds of morphological elements, in addition to urates (especially sodium urate) and minute albuminous granules, frequently are found adhering to them, which owing to their high semeiotic value, were justly designated by Frerichs as "heralds of the processes in the kidneys." Sometimes only isolated cells are found adhering to these casts, and not infrequently the latter are densely studded with them. Such forms constitute transitions to granular casts. Hyalin are easier to recognize by adherence of cells and also in consequence of the evidence of fatty changes which often are to be noted in them.

**Granular Casts** also occur in very variable size. Their surface is sometimes finely granular, especially

when they are composed of densely arranged sodium urate or fine albuminous granules; sometimes coarsely granular, when they consist of red and colorless blood-cells or epithelia from the renal tubules.

In some cases a clear conception of the formation of such casts can be obtained. Not infrequently a smaller or larger portion is composed of densely arranged blood-corpuscle or epithelia, while the remaining portion appears purely hyaline. At other times no trace of a cement substance can be made out in the casts. While in the former instance one is constrained to assume that the matrix of the casts consists of a hyaline material which is only in part densely studded with cells, in the latter instance one is tempted to conclude that the whole mass of the cast consists of cells without any cement substance. One will not go astray, however, if he assumes that a cement substance usually exists.

As the epithelia not infrequently undergo metamorphosis into fat-granule-spherules, one or more exquisite fat-granule cells are occasionally seen adhering to the casts. In rare instances even the entire surface of a cast is composed of densely arranged granule-cells, or by their coalescence the cast is densely covered with small and large fat-globules, the development of which from individual fatty metamorphosed epithelia is rendered probable or certain. Now and then more or less long, fat-crystal needles appear in such fat-granule spherules and casts.

**Waxy Casts** are much rarer, and usually are observed only in chronic forms of nephritis. They occur, however, also in severe and usually fatal acute nephritides. Often they are very long and usually much broader than the first-mentioned forms. They are distinguished from hyaline casts by their extremely sharp, intensely refractive contour and translucent character. As a rule, they are very resistant to acids, while hyaline casts disappear on their employment. Lugol's solution stains them sometimes reddish brown, and subsequent addition of sulphuric acid a dirty violet.

The mode of origin of casts is not fully understood. The most probable assumption is that they are albuminous derivatives and that their form is due to a coagulation like process. At all events, they originate in the renal tubules. Their occurrence, therefore, always points to the existence of pathological processes in the kidneys. That the simple presence of albumin, even in very large amount, does not suffice for the formation of casts is shown by the usually scant number of casts in orthostatic albuminuria; on the other hand, numerous casts may be excreted with complete absence or only traces of albumin (cylindruria). It is probable, however, that marked cylindruria is preceded by albuminuria.

While the occurrence of granular, blood, leucocyte, fatty and epithelial-casts point to severe disturbance of the kidney (usually nephritis), excretion of hyaline casts is not of very great diagnostic significance; indeed, it may be said that one granular is of more diagnostic importance than many hyaline casts. Casts with cellular constituents or materials derived from disintegration of cells, indicate pathologic processes in the kidney substance itself. Hyaline casts are found almost constantly, often with albuminuria, in renal congestion, icterus, and other states; they are scantily present also in orthostatic albuminuria.—(*Brook's Clinical Mic.*, 1916.)

62 Pierrepont Street.

(To be Continued.)



## Special Article

### Acute Poliomyelitis.

This disease, popularly known as infantile paralysis, which has been almost epidemic in various districts in the city of New York and which has also been observed with greater or less frequency in different parts of the country, is known in every land, but appears with greatest frequency in North America and the Scandinavian countries. The hot summer months see by far the greater number of cases.

The initial description of the disease was given by Underwood in 1774, but the first good clinical description was made by Heine in 1840. Rilliet and Barthez, of France, in 1851, described it as "essential paralysis of childhood." In 1865 Prevost and a bit later Lockhart Clark, observed that the anterior horns were affected and the present designation of the disease was given. Charcot and Joffroy, in 1870, described the trophic relation of the special cells involved to the atrophy of the nerves and muscles supplied and stated that the disease was due to primary inflammation of the cells themselves. Others who added materially to our knowledge of the disease are Medin, Drummond, Rossiter, Rogers and Damaschino, Marie, Goldschneider, Landsteiner, Popper and Levaditi, but the crowning glory belongs to Flexner, of the Rockefeller Institute.

Flexner and Lewis (*J. A. M. A.*, No. I, 1910) reported that they had produced the disease in monkeys by intra-cerebral inoculation with an emulsion of an affected spinal cord. The organism is thus described:

"The minute colonies are composed of globular or globoid bodies, averaging in young cultures 0.15 to 0.3 of a micron in size. The bodies appear single, double, short chains and masses. Monkeys have been inoculated with the twentieth generation of the culture; typical experimental poliomyelitis followed."

There is a great difference of opinion as to the methods of transmission of the disease. M. J. Rosenau (*J. A. M. A.*, p. 1627, 1912) gives the common stable fly as a carrier and Anderson and Frost (*U. S. Public Health Report*, Oct. 25, 1912) confirm his findings. Langhorst (*J. A. M. A.*, p. 2312, 1912) quotes two cases in which dogs acted as carriers. Manning (*MEDICAL TIMES*, p. 112, 1912) gave the bedbug, *cimex lectularis*, as a causative agent. Manning, with other writers, observed the coincidence of a similar disease among horses, sheep, dogs, cats, hogs and fowls during poliomyelitis epidemics.

Human carriers doubtless spread the disease, for the epidemic in Wickham, Sweden, in 1906, with 1,025 cases, was followed by the appearance of the disease in 1907 in New York and Boston, to which ports many Swedes had emigrated, and later it was found among Swedish emigrants in Iowa and Wisconsin.

The disease also seems to follow water courses, for it has appeared among boys who used the Delaware River for swimming at Bethlehem, Pa., Trenton, N. J., and Tarresdale, Pa.

The infectious agent is undoubtedly to be found in the dust of the street and the Editor of the *MEDICAL TIMES* is of the opinion that it is deposited by the wind upon fruit, vegetables, candy and other foodstuffs offered for sale, thus being easily transmitted. We believe if everything of a food nature were kept in dust proof containers one great source of infection would be removed. The cleaning of the streets by daily flushing would also tend to minimize the possibility of infection.

The first American epidemic occurred in Louisiana in 1841. The first serious epidemic was reported by C. S. Caverly, health officer of Rutland, Vt., in 1894, when in Otter Creek Valley 126 cases occurred, with 18 deaths.

The popular belief that only infants are attacked is dispelled by a study of the table of age incidence in the Wickham epidemic. Of the 1,025 cases, 183 were under 3 years, 214 between 3 and 6 years, 179 between 6 and 9 years, 229 between 9 and 15 years and 220 between 15 and 25 years.

In the New York epidemic in 1907, out of 729 cases, 62 were under 1 year, 221 between 1 and 2 years, 180 between 2 and 3 years, 10 between 3 and 4 years, 663 between 4 and 5 years, 28 between 5 and 6 years, 18 between 6 and 7 years, 11 between 7 and 8 years, 11 between 8 and 9 years, 7 between 9 and 10 years, 14 between 10 and 15 years, 5 between 15 and 20 years, 1 between 20 and 25 years and 2 over 25 years.

In speaking recently to a body of Brooklyn physicians who are seeking to eradicate the disease, Flexner said:

"The minute infectious agent enters the body chiefly, if not exclusively, through the mucous membranes of the nose and throat. Hence the mode of spread may be by kissing, coughing and sneezing.

"Since the disease attacks by preference young children and infants whose nasal and mouth secretions are wiped away by mother or nurse, the fingers of these persons readily become contaminated. The care of other children by persons with contaminated fingers may, therefore, lead to the conveying of the infectious micro-organism indirectly from the sick to the healthy. This danger also exists in connection with vendors of food which is eaten uncooked. The existence of cases of infantile paralysis in the homes of vendors of food is, therefore, a perpetual source of danger. Dissemination can be made by means of house flies.

"Treatment involves isolation of the acutely ill, proper care and destruction of contaminated discharges, supervision of persons in contact with the ill and of all vendors of food, exclusion of all flies, and general sanitary control of the personnel and habitation of families in which the disease exists.

"No age is absolutely free of danger of infection, although infantile paralysis affects chiefly young persons. It not infrequently affects adults. Moreover, the disease is one that can be communicated by healthy persons who have been in contact with the sick, but who are themselves well.

"The infectious agent is, so far as we can now judge, one of the most minute organisms known to cause disease. This conclusion follows from the fact that in aqueous suspension, such as is secured through preparing an emulsion of the spinal cord in distilled water, it passes with great readiness and little or no loss of potency through the pores of the densest and finest porcelain filters, namely, the so-called Chamberland filter. It passes with even greater ease through the somewhat less dense Berkefeld filter. It is extremely doubtful whether the virus has actually been seen. On staining film preparations of the filtrate with mordanting dyes, preparations are secured which under the highest powers of the microscope exhibit minute points, circular or slightly oval in form, which possibly, although not certainly, represent the stained parasite.

"When the filtrates are examined under the dark microscope, innumerable bright dancing points, devoid of definite size and form, and not truly motile, can be discerned. That these particles represent the micro-organism of poliomyelitis cannot be affirmed, since similar particles are present in filtrates obtained from nervous and other tissues which can be viewed also as consisting of simple protein matter.

"The filtrates are highly potent. Quantities as small as one one-thousandth to one one-hundredth of a cubic centimeter suffice to cause the disease in monkeys after the usual incubation period, when injected into the brain. The virus is highly resistant to external agencies and conditions. It withstands glycerination for weeks or months, very much as the virus of vaccinia or rabies does. It withstands drying over caustic potash for weeks without any or marked reduction in potency, showing a greater degree of resistance than the virus of rabies."

Practice affability—which is patience plus grace—through every waking hour, for not only as a matter of good breeding, but as an economic asset, it is worthy of all honor.

MATTHEW WOODS.

# The American Association of Clinical Research

JAMES KRAUSS, M. D., Permanent Secretary and Editor.

## SCIENTIFIC MEDICINE VERSUS SPECULATIVE MEDICINE.\*

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Boston, Mass.

What does scientific medicine represent? This inquiry must, sooner or later, be made by every true student of medicine, especially by every member of the American Association of Clinical Research who seeks to adhere to the main object of the association, the making and maintaining of scientific medicine.

In this era of mechanical procedures, of routine practice and medical incongruities, not everything that is brought in the name of science is really science. Men bring their medical pebbles, their grains of sand, sometimes substantial bricks, and raise them to the altar of scientific medicine as though scientific medicine consisted of pebbles, sand and bricks only, and its altar were that of religious creeds, to receive and to hold; but as the racial deposit of the ages, and not the repetition of more or less hysterical creeds, carries within the breast of all men the source as well as the fulfillment of religion, so the associative percepts of analytic inductive investigations, which cement the pebbles, the grains of sand, even the more substantial bricks of our clinical and laboratory observations into their natural relationships, and not the loose, more or less hysterical, observations of clinical and laboratory facts, carry our daily practice from mere monotonous repetition into the synthetic, perfectly provable, structure of scientific medicine.

Science is knowledge, correctly correlated knowledge. The gnosis of the Greeks, die Wissenschaft of the Germans, la science of the French, la scienza of the Italians, the Latinized science of the English-speaking nations—science being derived from the Latin *scire*—are all plainly knowledge, the organized knowledge of facts and relations of facts. *Science deals only with known elements*. As soon as we go outside of known elements we enter the field of speculation. Vere *scire* est per causas *scire*. Truly to know is to know through causes.

This saying of Bacon, the great English generalizer of human experience, takes us back two thousand years to Aristotle, the directing mind of the scientific ages, who first taught that to know, to cognize, we must know the causes of things—their form, substance, motion, end—and takes us forward two hundred-odd years to Kant, the greatest modern epistemologist and the greatest thus far of historic time, who taught that knowledge is confined to subjective consciousness and objective phenomena, and, therefore, has no place for the supersensual. By the formal, material, moving, purposive causes of things, the stagyrite meant not the real, unconditioned causes of things, which are necessarily elusive to the human mind, but the apparent, conditioned causes, the necessary antecedents of form, matter, motion and purpose of consequents of form, matter, motion, purpose: merely the necessary or invariable antecedents as against accidental antecedents, the necessary conditions and relations of sequence that go with manifest effects. We never get to know the real, unconditioned causes of things. We may say with John Stuart Mill that "it is hardly ever possible to ascertain" even "all the" (phenomenal) "antecedents"

of phenomena in nature. Neither the *exciting causes* of disease, developmental, traumatic, infective, nor the *predisposing causes*, inherited or acquired munity, are unconditioned antecedents or real causes in the true sense. They are merely proximate antecedents or relevant conditions. Even gravitation, though considered by Newton, in the third book of his Principia, as accounting "for all the motions of the celestial bodies and of our sea," he accepted merely as an existing condition, as a fact. "Hitherto," he said, "we have explained the phenomena of the heavens and of our sea by the power of gravity, but have not yet assigned the cause of this power. This is certain that it must proceed from a cause that penetrates to the very center of the sun and planets," . . . but, he concludes, "hitherto I have not been able to discover the cause of those properties of gravity from phenomena and I frame no hypothesis; for *whatever is not deduced from the phenomena is to be called an hypothesis*; and hypotheses, whether metaphysical or mechanical, have no place in experimental philosophy. . . . To us it is enough that gravity does really exist and act according to the laws which we have explained."

True causes, unconditioned antecedents, are, as far as our knowledge takes us, outside of our reach. What we deal with are conditions and relations. All true science is relative, related knowledge. When we correctly relate known facts to other known facts, we are scientific. Scientifically, we describe facts in relation with other facts to recognize facts; we explain facts in relation with larger facts to comprehend facts; we connect facts in their relations with other facts to use facts. It is correct relationship that organizes knowledge of facts or particulars, a knowledge unorganized and unrelated which is not science, into a knowledge of relations or generals, a knowledge organized and correlated which is science.

In scientific medicine, we apply our knowledge of medical facts to medical facts in their necessary, true relations. *Scientific medicine* is the applied science of medicine, *medicine applied experimentally*, not empirically. The experimental nature of scientific medicine distinguishes it from all non-scientific, speculative forms of medicine.

In experimental medicine, there is no more place for a hypothesis without foundation in phenomena than there is in Newton's experimental philosophy; but for a truly scientific experiment, medical or non-medical, we must, first, have a hypothesis founded in phenomena which can serve as *experimental relationship*, and, secondly, we must frame the *necessary experimental conditions* in consonance with our hypothesis or experimental relationship. A hypothesis to serve as a true experimental relationship for scientific medicine, as the natural, the logical experimental relationship for the experimental association of medical conditions or facts, must have a foundation in phenomena and must be obtained by induction through consistent analysis of presenting phenomena: the hypothesis or relationship must be a true inductive percept.

We have often been told that half the doctors guess, that they experiment. This is partly true and partly false. It is true that half the doctors guess; perhaps more than half, a good many more than half, guess; but when they guess they do not truly experiment, and

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when they truly experiment they do not guess. True experimentation is not guessing. True experimentation is the highest form of scientific practice, and is based upon exact knowledge of facts and of the necessary relations of facts. Where this exact knowledge of facts and of their necessary relations is wanting, there is no true experiment. An experimental science is a science based on human experience and in so far is empirical in nature, but it is not so empirical as to be based upon authority, that is, recommendation, or upon conjecture, that is, guessing, or even upon repeated blind trial, that is, mere testing. By some sort of misconception, empiricism and experimentation are often used as though they were identical terms, but they are far from being identical. A medical empiric guesses. A medical experimenter knows; he knows his experimental relation, his experimental conditions, and knows what to expect from their correct conjunction.

Medical empiricism is a form of practice depending on trial and recommendation, a kind of conjecture: *A* cures, or thinks he cures, *B* with *C*; thereupon tells *D*; *E* becomes sick and calls *D*; *D* gives *C* to *E*, because *A* had told *D* that *C* has cured *B*; *D* does not know that *E*'s sufferings were exactly those of *B*, and cannot know that *C* actually cured *B* or would likely cure *E*. *A*'s story to *D* cannot assure successful repetition on the part of *D*, and the possibility of successful repetition is the first characteristic element of scientific procedure. Depending on the whim of a moment or empiric recommendation, medical empiricism is not scientific. At best, and at its truest, medical empiricism has nothing to impart except the phenomenon, the fact, of an observation. For science, we must have more than the phenomena of observations, more than their positions in space. We must have their relations of sequence in the order of time. We must have their relations of mutuality in the order of their action. We must have the phenomena and their necessary natural, true relations in the order of their position, sequence and action for scientific, or, what is its equivalent, experimental medicine. We must have the circumstances under which one set of phenomena occurs and the circumstances under which other sets of phenomena occur.

Medical empiricism, which, at its best, presents only a knowledge of particulars, a knowledge of individual empirics or empiricists, which never is, was, or can of itself be science, because mere use, enumeration, observation or experience without the analytically evolved inductive percepts resting in the empiric phenomena is not science, is constantly acclaimed as representative of scientific medicine. This confusion can occur only because of the misconception that the unorganized experience of an individual is as truth-compelling as the organized experience of the race. Empiricism as the organized experience of the race, evolved from observation of phenomena and organized upon the recognition of their relations, enables us to foresee effects, permits prevision. Individual experience, the problematic unorganized experience of medical empiricists, cannot enable one to foresee effects; the constant relationship of the empiric observations is not evolved; and to overcome this discrepancy the wildest speculations are pressed into service with most improvident haste. Men will speculate if they have not a sufficiency of observed phenomena for the making of inductive, associative percepts; and the confusion does not end here.

Observation and analysis lead to discovery, make for investigation and demonstration. Experimentation and synthesis make for invention, for practice and proof. It

is one thing to observe and quite another thing to experiment. It is one thing to demonstrate and quite another thing to convince. It is an unpardonable error to use a hypothesis for observation and an equally unpardonable error not to use a hypothesis capable of serving as a true experimental relationship for experimentation.

The classic "experiment" of Galen (131-201 A. D.), consisting of the ligation of both carotids in animals, to prove that the soul depends on breathing (all the three forces of the soul, sensitive, pulsating, vegetative, and their substrata are maintained in their integrity by breathing, the intake of pneumazotikon), was to prove a hypothetical assumption, a hypothesis without foundation in phenomena by experimental conditions not inherent in the hypothesis; and when he observed that though both carotids were ligated the animals nevertheless lived he naturally ended in another hypothetical assumption, another hypothesis without foundation in phenomena, to wit: He assumed that the vital force reached the brain directly through the sieve-like perforations of the ethmoid.

An assumption can end only in assumptions. A hypothesis must be an analytically evolved inductive percept. A hypothesis is a hindrance to correct observation, but a necessity for correct experimentation. The hypothetical percept must be reached by analysis of observed phenomena, and then may be properly employed for the associative relationship of synthetic experimentations.

The classic "experiments" of Harvey (1578-1657 A. D.), models for investigations in the fields of medicine, consisted of numerous dissections of the human body as well as of lower animals, embryos and adults, for observations of the structures of the heart and blood vessels in a state of death; of numerous vivisections and consecutive observations with a simple lens, a perspicillum, of the action of the heart and blood in living dogs, pigs, mice, toads, frogs, serpents, lizards, fishes, slugs, oysters, lobsters, insects, shrimps, geese, snipe, chicks in the shell, etc.; of obstructions of the blood stream in arteries and veins by forceps in the case of a snake, and by ligature on the arm of a man; of observations of the effects of position on the circulation, of absorption of animal poisons and external medical applications. While the Fellows of the College of Physicians are directed in the language of Harvey's Foundation "to search out and study the secrets of nature by way of experiment," yet all that can be found is that Harvey arrived at his monumental results not by way of experiment, i. e., with a hypothesis founded in phenomena and with conditions inherent in the hypothesis, but by patient observation without any hypothesis and conditions necessarily attached thereto, and by subsequent analytic induction. When opposed by men of his steel, such as Caspar Hoffmann of Nuremberg, he besought them to convince themselves, not by preconceived hypotheses, but by actual inspection, of the truth of the facts in question.

In his *Anatomic Disquisition on the Motion of the Heart and Blood in Animals*, his justly celebrated *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, Harvey pursues two main series of facts:

1. Erasistratus had "imagined that the arteries contained nothing but spirits." Galen had held that the blood in the left ventricle of the heart passed into the arteries and the blood in the right ventricle into the veins; that part of the blood of the right ventricle permeated into the left ventricle through "pores" of the interventricular cardiac septum to mix with air in the left ventricle; that respiration and the pulse beat were for one and the same purpose of receiving air into the arteries of the body; that the skin also played an im-

portant part in supplying the body with air, the pores of the skin absorbing the air and distributing it through the arteries; that the mixture of blood and air carried by the arteries was to cool the body; that the arteries were expanded like bellows and the pulse, the vis pulsifica, depended upon the membranous coverings of the arteries.

These were current teachings at the time of Harvey. Even Vesalius (1513-1564 A. D.), who certainly did his best as the father of human anatomy to bring men to study human anatomy by dissections of the human body and not of the lower animals, to bring men to see anatomically things as they are and not as they might be, who found the foramen ovale and the ductus arteriosus in the embryo and correctly taught the passage of the venous blood into the right heart and not from the right heart into the veins, maintained that the blood in the right heart permeated into the left heart through the "pores" of the cardiac septum, that the pulmonary veins carried spirit of air into the left heart to unite with the venous blood sweated through the pores of the septum. The right ventricle was supposed to contain blood destined to nourish the lungs, the left ventricle to receive through the "pores" of the septum some of the venous blood of the right ventricle to mix with spirit or air, allowing, at the same time, the escape of consumed substances as fuligo through the pulmonary veins. The arteries were also supposed, at their diastole, i. e., when expanded, to take up air from outside, and at their systole, i. e., when contracted, to send out fuligo.

These teachings, Harvey contended, were false:

*Because* in the bath, with the external air excluded from the largest portion of the skin, the pulse does not get smaller—an observation;

*Because* foetuses and water animals live, though their skin is entirely excluded from the atmospheric air—an observation;

*Because* arteries, when severed, spurt only blood—an observation;

*Because*, upon ligation, the temperature of the parts supplied by the ligated arteries decreases—an observation;

*Because* the heart moves simultaneously with the arteries and fills the arteries—an observation;

*Because*, from a severed artery, the blood spurts away from the heart, with greater impulse at the diastolic expansion of the vessel than at its systolic contraction—an observation;

*Because* arterial blood spurts forth with greater impetus at the diastole of the vessel, with its membranous coverings severed, and the pulse is felt even in spurious aneurysms, which are free of membranous coverings—an observation;

*Because* pulse-beat and respiration are not always proportionate in their frequency—an observation;

*Because* the two ventricles and their valves are similar in structure—an observation;

*Because*, after death, both ventricles contain only blood—an observation;

*Because* the large vascular trunks of both halves of the heart are similar in structure—an observation;

*Because* the pulmonary artery is much too large for mere nutrition of the lungs—an observation;

*Because* the right heart pulsates—an observation;

*Because* the pulmonary vein is much frailer in structure than the pulmonary artery—an observation;

*Because*, after death, the pulmonary vein contains rarely blood—an observation;

*Because* air cannot be blown from the lungs into the pulmonary vein—an observation;

*Because* the structure of the pulmonary veins is like that of a vein and not of a bronchus—an observation;

*Because* the foramen ovale, open in the foetus, closes after birth—an observation;

*Because* the two ventricles contract simultaneously and thus impede any possible passage of blood through tiny pores of the interventricular septum—an observation;

*Because* "By Hercules! there are no such pores, and they cannot be demonstrated!"—an emphatically expressed observation, and nowhere the remotest trace of a hypothesis.

2. For the second main series of facts, Harvey posited, after numerous investigations in all sorts of animals:

*That* the auricles of the heart contract and drive the blood into their corresponding ventricles, the right auricle the blood received from the veins through the superior and inferior venae cavae, the left auricle the blood received from the lungs through the pulmonary veins—an observation;

*That* the ventricles contract at the same time, forcing the blood into the arteries, the right ventricle into the pulmonary artery, the left ventricle into the aorta—an observation;

*That*, the ventricles being filled, "the heart raises itself straightway, makes all its fibres tense, contracts the ventricles, and performs a beat, by which beat it immediately sends the blood supplied to it by the auricles into the arteries"—an observation;

*That* "these two motions, one of the ventricles, another of the auricles, take place consecutively, but in such a manner that there is a kind of harmony or rhythm preserved between them, the two concurring in such wise that but one motion is apparent, especially in the warmer blooded animals, in which the movements in question are rapid"—an observation;

*That* the contraction of the heart and that of the arteries are not simultaneous, but consecutive to enable the propulsion of the blood, the diastolic expansion of the arteries coinciding with the systolic contraction of the heart and the systolic contraction of the arteries with the diastolic expansion of the heart—an observation;

*That* "the pulse which we feel in the arteries is nothing more than the impulse of the blood derived from the heart," the impulse driving the blood stream along the arterial tubes to the very extremities of the body—an observation;

*That* the valves of the veins are so arranged that the blood may flow from the smaller veins into the larger trunks and thence into the heart, but not vice versa—an observation;

*That*, at the diastole following the systole, the heart receives blood in a purely passive manner—an observation;

*That* all the blood passes in a certain time through the heart into the arteries, compression of the arteries resulting in distension above the compression; the blood being more than is required for the nutrition of the body, the excess, of necessity and constantly, flows back to the heart by way of the veins, compression of the veins resulting in distension below the compression; "the blood, forced by the action of the left ventricle into the arteries," is "distributed to the body at large, and its several parts, in the same manner as it is sent through the lungs, impelled by the right ventricle into the pulmonary artery, and \* \* \* then passes through the veins and along the vena cava, and so round to the left ventricle in the manner already indicated," and this



"motion," Harvey declared, he "may be allowed to call circular"—an inductive percept evolved from the observed phenomena of the heart and blood in action and sequence expressing their physiologic relationship.

Harvey had examined the action of the heart and blood vessels and the motion of the blood fluid without any preliminary hypothesis, and when Malpighi (1628-1694 A. D.), at a later day and with a more powerful lens, could observe the capillaries and thus bring the circulation of the blood to indisputable certainty and clearness, it was still a matter of pure observation and analysis.

*This analytic observational attitude is the scientific attitude for medical investigators.*

*The synthetic experimental attitude is the scientific attitude for medical practitioners.*

The intense experimental activity of the last forty years, ushered in with Koch's bacteriological theses, has left us in this position: While we may fulfill the first condition of Koch's theses, that of observing given pathogenetic bacteria in tissues and fluids of the diseased body, we cannot always fulfill the second condition of cultivation outside the body and the third condition of reproduction of given bacterial diseases in individuals of the same or of a responsive species.

Biochemical investigations have placed in our grasp this fact: External agents introduced into the human organism and incorporated in human tissues change their original properties and acquire characteristics of the human organism. Serum albumen, for instance, though derived from food, is no longer a food protein, but a blood protein. Even parasites accommodate themselves to their human host.

For observation and analysis of human physiologic and pathologic phenomena, we have to fall back upon the human organism. In human anatomy and physiology, human pathology and therapeutics, we are dealing with phenomena as effects and not, as is commonly assumed, with things as causes. This indisputable fact obligates every medical investigator, first, to obtain his phenomena as effects, and then only, if he wishes to arrive at the causes or invariable conditions of these effects, to obtain all the antecedent phenomena that go to make these consequent effects. There is no likelihood that we can ever know all the antecedents of our anatomic and physiologic, pathologic and therapeutic phenomena, and we cannot deal with these phenomena as effects as we might deal with things as causes. We cannot arbitrarily, or artificially, vary the circumstances to effects without altering the effects we wish to study. Therefore, what is popularly known as *experimental inquiry*, applying the Baconian rule of varying the circumstances to artificial as well as to natural instances, producing "the precise sort of variation which we are in want of for discovering" the causative laws of phenomena, introducing one well-defined circumstance after another to observe how a phenomenon behaves under a variety of possible circumstances, framing hypotheses and finding to what law of nature the facts correspond, cannot, at the best, cover a respectably wide range in human anatomy, physiology, pathology and therapeutics.

The constant failures of medical investigators are plainly due to the fact that they deal with medical phenomena as causes and not as effects, and, when they look to phenomena as effects, that they do not isolate the phenomena as phenomena but complicate them with notions not belonging to the phenomena. It is not in our power to produce effects at will when we do not possess the conditions that produce the effects. With effects,

we cannot choose the concomitant circumstances with which the effects shall appear. We may only discover what the circumstances are when the effects do appear. We may observe the effects as wholes and then resolve them into their component parts or elements; divide wholes into parts, physically, in anatomy and for anatomic therapeutics; decompose compounds into elements, chemically, in physiology and for physiologic therapeutics; separate symptoms and signs, analytically, in pathology and for pathologic therapeutics; obtain pathologic and therapeutic phenomena in their naked, natural form, and, in the scientific practice of medicine, synthesize them, as in scientific investigations of medicine we must analyze them, as effects and not as causes.

This correct scientific attitude, based upon the indisputable fact that in scientific medicine we are dealing with pathologic and therapeutic phenomena as effects and not as causes, we owe principally to the historic influences of two men: the Greek, Hippocrates (460-377 B. C.); the German, Hahnemann (1755-1843 A. D.). Hippocrates brought pathologic phenomena within the category of analytic observation. Hahnemann brought therapeutic phenomena within the category of analytic observation. The Hippocratic-Hahnemannian attitude is the attitude of scientific medicine.

Scientific medicine demands exact knowledge of anatomic, physiologic, pathologic and therapeutic phenomena as effects for scientific comparison as to their respective natural relationships and as known and knowable experimental conditions of analytically evolved and, therefore, known and knowable experimental anatomic, physiologic, pathologic relations of therapeutics for scientific experimentation.

The true experimental nature of scientific medicine gives no room for guessing:

1. *We must know* and obtain the phenomena of disorders and diseases in their natural nakedness, the subjective and objective phenomena of abnormal sensation, intellection, emotion, motion, alimentation, respiration, circulation, elimination.

2. *We must know* and determine what physiologic relationships there are in these phenomena and then apply, in consonance with such relationship, the experimental conditions of physiologic ingredients—food and drink, climate, heat and cold, rest, work, exercise, gymnastics, massage, electricity, light and air, of *somatotherapeutics*, and hope, direction, education, environment of *psychotherapeutics*—to physiologic phenomena.

3. *We must know* and determine what anatomic relations there are in these phenomena and then apply, in consonance with such relationship, the experimental conditions of anatomic measures—suture or other coaptation, incision, excision, bloody or bloodless reconstruction of *surgical therapeutics*—to anatomic phenomena.

4. *We must know* and determine what pathologic relations there are in these phenomena and then apply, in consonance with such relationship, the experimental conditions of proved pathogenetic medicinal substances of *pharmacotherapeutics* to curable and incurable pathologic phenomena—(a) to symptoms and signs of curable states of topic, plastic, trophic, toxic diseases: medicines proved to be capable of exhibiting as their effects in the healthy human body similar symptoms and signs, conditions of *homoeopathic pharmacotherapeutics*; (b) to symptoms and signs of incurable states of topic, plastic, trophic, toxic diseases: medicines capable of exhibiting as their effects in the healthy human body dissimilar or contiguous symptoms and signs, conditions of *alloeopathic pharmacotherapeutics*, or (c) medicines exhibit-

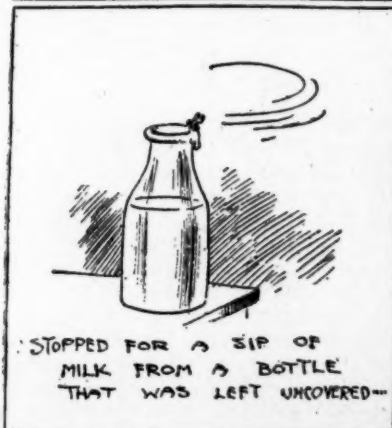
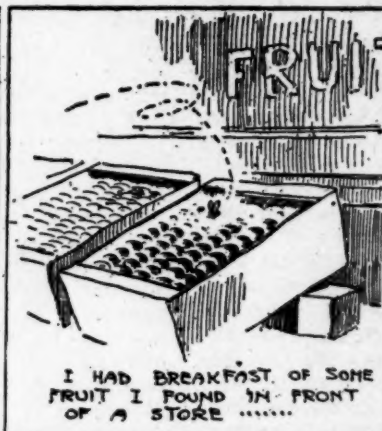
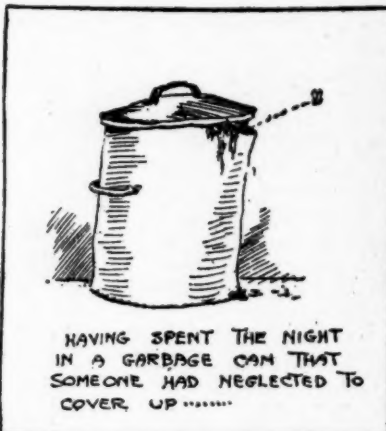
ing as their effects in the healthy human body contrary symptoms and signs, conditions of *antipathic pharmacotherapeutics*.

The requirements for the correct practice of scientific medicine are clearly established. It is for us to observe anatomic, physiologic, pathologic, therapeutic phenomena as naked phenomena; to analyze them as effects; to experiment with their anatomic, physiologic, pathologic relations as inductive hypotheses for experimental therapeutics; to apply physiologic ingredients to physiologic phenomena as experimental conditions of somatic and psychic hygiene or physiologic somatherapeutics

and psychotherapeutics; to apply anatomic measures to anatomic phenomena as experimental conditions of surgery or surgical therapeutics; to apply medicines according to their proved pathologic effects to curable and incurable pathologic phenomena as experimental conditions of medicinal therapeutics. It is for us to acquire this correct attitude for the scientific practice of medicine, and, in the spirit of the expressed object of the American Association of Clinical Research, to see that no truth of medicine be overlooked, misrepresented, misplaced, ignored.

419 Boylston Street.

### A DAY IN THE LIFE OF A FLY.



HAL CORFMAN



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## Poliomyelitis.

The poliomyelitis epidemic has served better to define the proper functions of our Health Department. If the Department, in the recent past, had limited itself to what most of us consider its legitimate sphere, it would in all probability have been in a better position to cope with the epidemic, or to prevent it.

While we have been impatiently and futilely asking ourselves the question—"where should the activities of the Health Department end?"—an infectious disease has answered it clearly.

We trust that the significance of the epidemic will not be lost upon the profession and public. It should do more to regulate the Department's aberrant activities than all the conventional and apparently useless forms of protest combined.

At last further talk is unnecessary; surely the Department has been severely chastened and, in popular parlance, will take a tumble to itself.

Too much remains to be done in public health work of a legitimate character, as is now tragically and indubitably revealed, for the community further to tolerate doctrinaire philanderings, involving among other things the greasing of the wheels of attempted socialization. Let the Department abjure its part in the betrayal of the profession and in future be about its proper business, lest an awakened and wrathful people take a hand and end what has been a comedy too costly in lives ever to be staged again.

*Verb. sap.*

## The Turning of the Worm.

In several recent issues of the *Boston Medical and Surgical Journal* there have been letters advocating and opposing the foundation of an American Association of

General Practitioners. Good points are made both for and against. From several points of view the proposal seems timely, and we have no doubt that something will crystallize as a result of the agitation and discussion. The position of the general practitioner is in danger of becoming an equivocal one, and a strong, dignified organization ought to go far toward rehabilitating this type of medical man and compelling just recognition of his existence, importance and rights. The calumnies and discriminations against him have been nothing short of outrageous. There is no finer figure in the profession than the best type of general practitioner. An American Association of General Practitioners will not magnify differences but merely identify merit and insure a just status now in jeopardy.

## The Care of Dependent Children.

In a recent weekly bulletin of the Department of Health there were some astonishing figures bearing upon children in institutions for the deaf. About 30 per cent. of the deafness was found by medical examiners of the Department to be due to *remediable conditions*. Eighty-five per cent. of the 30 per cent. constituted cases whose deafness was due to impacted cerumen, and 2 per cent. of the 30 per cent. represented cases whose disability depended upon the presence of foreign bodies in the ears! How can such figures be accounted for? Is it possible that in an institution for deaf children the causes of their deafness are never looked into? Is it possible for a child to be committed to such an institution and left there indefinitely because of a condition remediable in a few minutes? It seems hardly credible. The Department's bulletin made no comments, simply publishing the figures quoted by us, unless the title of the article be considered a laconic criticism—"Why Some Children Are Hard of Hearing."

These are illuminating figures, in the light of recent inquiries into the conduct of our institutions for children.

We wonder why the Department's bulletin publishes the names of milk dealers, egg merchants and meat sellers who have offended against the community, but fails to name the institutions which neglect children so woefully?

If the medical men attached to the visiting staffs of our institutions for children receive little or no pay for their services, if they are too busy with private work to give proper attention to their charges, if they live at such distances from the institutions as to make visitation onerous, if children are not medically looked after with any thoroughness until they actually succumb to mastoiditis or cardiac disease, and if the institutions employ no trained nurses, we would seem to have the keys to the shortcomings under discussion.

The medical care of institution children includes far more than concern about epidemic disease. It includes dealing with remediable defects, periodical examinations, trained nursing, proper hospital equipment, intelligence testing and classification, prophylaxis, sanitation and hygiene, and the great questions of nutrition and physical training. These should all concern us deeply, even when the time comes in which we shall use the institutions solely for defective and delinquent children, in which normal children shall have homes found for them in subsidized private families where they shall be subject to frequent supervision, and in which they shall be examined at stated intervals at a central clinic, where there shall be facilities for a residence of at least a month preceding disposition of any child, during which time the mental and physical constitution of every

child shall be thoroughly studied, including Wassermann and Binet-Simon tests, and the application of every pediatric resource. This would be the time to remedy defects. Through such a clearing house should pass all dependent children prior to institutional or home distribution.

### Does Labor Favor Compulsory Health Insurance?

The bread of the needy is their life; he that defraudeth him thereof is a man of blood.

He that taketh away his neighbor's living slayeth him; and he that defraudeth the laborer of his hire is a shedder of blood.  
—*Ecclesiasticus*.

Many medical men have been misled by the title of the organization which has been accelerating legislative action on health insurance in various states—American Association for Labor Legislation. Doubtless this title was selected with malice aforethought. It is undeniable that an impression is given by it that labor is behind its acts. The truth is, of course, that compulsory health insurance is not favored by the trade unions. Its failure in England and its actuarial unsoundness as planned are among the reasons upon which their objections are based. Mr. Ralph M. Easley, chairman of the executive council of the National Civic Federation, has the following to say on the subject:

"This proposed legislation—avowedly offered as a cure-all for helpless poverty—is pressed without regard to the opposition to precipitate action by organized labor, the only channel through which the wage earner's voice may be heard, and without adequate investigation of what is being done in the United States by voluntary agencies at the present time. As to the actuarial soundness of the plan so insistently recommended, there are grave doubts, since the preponderance of opinion among insurance experts is that the assessments proposed will in no wise cover the stipulated benefits.

"It is believed by leaders of the labor movement that the American workingman should be left in the position to choose his method of insurance.

"Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, represents the views of labor in general in the statement: 'The whole idea of the workingman is to avoid paternalism.'"

### The Physical Cause of the Death of Christ.

Sir William Turner, the distinguished British anatomist, and Sir Alexander Simpson, M.D., after careful study of the circumstances attending the death of Christ, have given us the benefit of their conclusions checked by their large pathological experience.

St. John relates the piercing of the side with a spear, and states that this was not done until after Christ was dead, and after the soldiers had parted His raiment among themselves. The expression that from the wound "forthwith came there out blood and water" has led to some discussion on the immediate cause of the death of Christ. That which most commends itself is the explanation given by Dr. Stroud, which has been energetically supported by Sir Alexander Simpson, that in the agony the heart, or one of its great arteries, ruptured into the bag enveloping the heart, into which the blood escaped. Sir William cites several cases of rupture of the heart and of the great artery which he has personally examined, in which the pericardial bag was greatly distended and the blood had separated into clot and watery serum. The statement which has been made by some writers, that this separation does not take place when the blood flows into the pericardium, is therefore incorrect, for the clot in such a case forms a cake surrounding the whole or the greater part of the heart and remains for days without undergoing decomposition. If the pericardium were to be pierced shortly after the rupture by a sharp weapon, such as a spear, both blood clot and watery serum would

escape from the wound. That the blood and water at the crucifixion, as has been surmised by some, had been derived from a bleb formed on the outer surface of the body and evacuated through puncture by the spear, and not from within the chest, is a wild conjecture, altogether unsupported by evidence.

Artists conventionally represent the spear-thrust as aimed at some point on the right side. Sir Alexander Simpson calls attention to Rubens' Crucifixion, in Munich, in which an exception to the conventional rule is noted by him.

### Which is the Sounder Opinion?

Following is the charge of the trial judge in a manslaughter case before the Circuit Court of Appeals in December, 1915 (Perkins vs. the United States):

"Now, I charge you that expert testimony has fallen into what I might term in many respects 'an undeserved repute.' You see in the papers jokes about the experts, especially in cases of insanity. But I charge you that expert testimony is admissible by law, and it is very valuable within its proper limitations, and that is the expert testimony of a man who knows something from his own experience. \* \* \* But when a man proceeds to speak expertly about matters not within his own knowledge and experience, then his testimony begins to be of less value. \* \* \* If he say, 'I myself gave fifteen grains of chloral to a man and he became insane,' no one can dispute that that is testimony of very high character; but when he testifies from the books, showing the experiences of another, you have no way of checking such observations, and what he states is only, so to say, hearsay testimony, unless it is corroborated by the witness's own experience."

The Appellate Court has condemned this charge, quoting in its opinion the following from 1 Wigmore on Evidence, 782:

"To deny the competency of a physician who does not know his facts from personal observation alone is to reject medical testimony almost in its entirety. To allow any physician to testify who claims to know solely by personal experience is to appropriate the witness stand to impostors. Medical science is a mass of transmitted data; the generalizations are rare which are the result of one man's personal observation exclusively. The law must recognize the methods of medical science. It cannot stultify itself by establishing, for legal remedies, a rule never considered necessary by the medical profession itself. It is enough for a physician, testifying to a medical fact, that he is by training and occupation a physician; whether his source of information for that particular fact is in part or entirely the hearsay of his fellow practitioners and investigators is immaterial."

### Our Alien Guests.

The number of alien insane now in our State hospitals has risen to nearly 10,000, or about one patient in every four. The total annual cost of caring for these guests is almost \$2,000,000. None are citizens, yet we are supporting them with no help from the Federal Government.

There is something wrong about such a situation. It would seem that our legislation has been such that the officials who are responsible for the indefinite continuance of this waste of the taxpayers' money cannot be held personally responsible. More than a reasonable time has elapsed in which this problem could have been dealt with. Now we have the feeble explanation that the war has prevented deportations.



On with the dance, at a cost of \$2,000,000 a year. Every year or two we shall have more interesting statistics. Nobody can be called to account, so the question simply resolves itself into a periodical statistical study.

#### Alcoholism in England After the War.

It will be very interesting to see whether England, after the war, will be able to control drunkenness as she is now controlling it through the Central Liquor Control Board. This board is concerned mainly with the efficiency and productiveness of workers in munition areas; it took over control early in 1915. Drunkenness has been reduced about fifty per cent. as compared with conditions before the war. This has been brought about by penalizing all treating and by restriction of the hours of sale. Liquor may now be sold between noon and 2:30 P. M. and 6:30 and 9:30 P. M. on week days, and on Sundays between 1 and 3 P. M. and 6 and 9 P. M. The buying of liquor on credit is not permitted. Limited hours are also prescribed for the sale of bottled liquors for consumption off the premises where such sales are made. The board has confined the consumption of alcohol to those hours which conflict least with the working day and which coincide with meal hours. There has been far less disorderly conduct than ever before.

It seems hardly likely that England will be able to keep up such a pace in time of peace. The exigencies of the war have made the present situation possible.

A few good words may be said for war. Nowadays it greatly reduces alcoholism—anything at all that will do that is entitled to a good word; it prompts the individual to sacrifice personal convenience to national efficiency in great crises, and it eliminates the unfit among non-combatants.

#### Thought and Action.

Say what you like, thinking is demoralizing if you are a man of action, particularly a man concerned with things that you often have to do and which are vitally important. We mean, of course, that it is a bad thing to think about anything but the matter in hand. Take the surgeon; it is best that he be not so cultured and thoughtful as to be unable to keep his mind off a paper on Galen as surgeon to the gladiators when he is relieving a Lane's kink. Take the physician; it is best that he not think about the side-chain theory when going over a chest.

Now there are those who think that the ideal physician is one who strikes a cultural balance and who is deeply interested in many things besides medicine. Unquestionably such a man is more human and attractive, but the man who has a passion for medicine alone is apt to be a better and a safer doctor, however much of a bore he may be outside of the sick room. In this discussion we are taking no account of the man who pretends to cultural veneer that deceives but few.

Upon the whole, the man who devotes the major part of his thoughts in repose to the work that he does in action, and who, when in action, thinks only about the particular job he happens to be doing, is a good man to employ.

Versatility is a great thing from an esthetic standpoint, but when one has an acute abdomen a thorough craftsman is needed; one doesn't care then how little the operator knows about Arabian medicine or old china.

## Miscellany

CONDUCTED BY ARTHUR C. JACOBSON, M. D.

### Ape-Like Tommies, Soldierly Apes and the Military Reclamation of Human Wastrels.

A few weeks ago a prominent metropolitan daily, in its Sunday magazine section, had a most interesting article on the breeding and training of anthropoid apes with the aim of using them to supplant human labor of the most arduous and least skilful sort. The practicability of the scheme was quite convincingly established, a number of scientists endorsing it. There were even interviews in the course of the article with well known clergymen in which their opinions were sought and expressed with respect to the moral implications and considerations. Certain medical aspects were taken into account.

It would seem timely to suggest the utilization of the anthropoids as substitutes for human soldiery. Why not let them fight our battles for us? There would be something more fitting about military shambles under the auspices of apes than under those of men. Prepare! Prepare!! Prepare!!!

A cynic friend thinks that the scheme applied to military matters is unnecessary, since the war in Europe seems to be carried on with all the élan and frightfulness that one could expect of man-like apes. Why, he asks, substitute man-like apes for ape-like men?

The feeble-minded are said to be great breeders. Why not take advantage of the fact?

We think of the reproduction of the unfit as a most unfortunate social matter. It would be a fortunate matter if we handled the problem as it could and should be handled.

We succeed in holding but a very small proportion of the feeble-minded under control; most of them are reproducing at a great rate. So far as we know the sterilizing scheme has not been carried out on any scale worth talking about.

What society should insure is that no feeble-minded person should mate with a normal human being. But the feeble-minded should be drafted for the service of the state and reproduction among themselves encouraged.

The feeble-minded should be employed upon great public works and upon all civic undertakings not requiring skill. Road building is a type of the work that they could do.

Such employment would be more healthful for them than moping around institutions of the familiar sort.

This scheme appeals to us as even more rational than the proposal to breed and train anthropoids for similar service. So far as moral considerations are concerned, much can be said pro and con. Would such a system be a slavery? Would the employment of the anthropoids be revolting to the moral sense? Is an anthropoid any more objectionable, "personally," than a low grade imbecile? Many questions come to mind.

The same thought arises in connection with the feeble-minded as has occurred in the case of the man-like apes, with respect to their utilization in warfare.

For the brutish side of war it would seem eminently more fitting that we employ apes, or the feeble-minded, or both, rather than normal men. Under the leadership of men trained in the management of such cohorts, a high degree of efficiency would be attainable, and the

dreadful sacrifice of normal human beings averted. An enlightened selfishness dictates some such policy. If we must have war let us set only the beasts and sub-normal men upon each other.

Bismarck said that if soldiers were thinking men they would not be fighting men. If men who don't think or can't think make the best soldiers, why wouldn't the feeble-minded make ideal soldiers? And thirteen dollars a month would secure just about the right kind of material.

Finally, England's intensive utilization in a military way at the present time of the populations of her criminal institutions affords further food for thought.

#### Rational Family Limitation and War.

The *Sun* declares, without any real intent to further the birth control propaganda, that "the only way, clearly, for the anti-war fanatic to guard his children surely against war is to have no children." Of course, the *Sun* simply overstates the indication. Havelock Ellis and other thinkers believe that limitation of the birth-rate is the surest preventive of war. Over-populated countries have to expand, and expansion means aggression.

#### The Dog-in-the-Manger Type of Reactionary.

The resistance of some misguided people to the Charities Department's plan to place normal children who are dependents in private families instead of institutions is about as stupid and futile as the resistance of certain communities to hook worm hygiene. Resistance to such kinds of progress is inevitable, but not inscrutable.

#### The Psycho-Pathology of Pacifism and Militarism.

In the July *Atlantic Monthly* Dr. Frederic Lyman Wells, of the McLean Hospital at Waverley, Massachusetts, accounts for pacifists and militarists. It is a simple matter of psycho-pathology. Both the militarists and pacifists are the result of primordial instincts. Militarism grows out of such instincts as self-display, self-assertion and self-protection; pacifism results from self-abasement, which stands for flight, concealment and death-shamming instincts, and also grows out of the pleasure-seeking, familial and economic instincts which conflict with and block the instincts that involve self-sacrifice for the group. Both militarists and pacifists rationalize their instinctive tendencies and use defensive and self-laudatory patter. The militarists talk of patriotism and glory, the pacifists talk of non-resistance in other-worldly fashion. The pacifists correspond in our modern life to the ascetics of an older day, which is why they talk about the dulling of the higher sensibilities by war. "Both asceticism and pacifism are characterized by not wanting normal objects of life enough to undertake struggle with others who want them more." After the safety of the group has been secured the pacifist appears. He hates war in proportion as he fears the loss or jeopardy of his esthetic, and often effeminate, culture, his pleasures and the continuity of family life.

There is much that is plausible in Dr. Wells's argument, but it is because the ruling class in England fear the loss or jeopardy of their estates and power that they have all given so freely of their services. It is their pleasures and their license that they are concerned about. In them yet lives the Norman conquerer. "Self-sacrifice for the group"—what a joke! Their talk of patriotism and glory is for the benefit

of the working class, who are misled to believe that they, too, have everything to lose—freedom (this in a country where they do not have full manhood suffrage), the privilege of being industrial slaves, and their country itself (they are actually persuaded to believe that a country is their country of which they can never hope to own an acre). They, we are asked to believe, care enough to undertake struggle with others who want the normal objects of life less than they do. Well, after these fierce militarists of the working class have fought, will they get the normal objects of life that they have never had? Not if the ruling class can prevent it.

Our own conception of the psychology of the average pacifist is that he is a straight thinker who cannot be made to fight for something which he does not possess, but which it is insisted he does possess. We are not defending him as standing upon a higher plane than the militarist. He would think and act just like a militarist if he really possessed what he is asked to believe he does possess. What the anemic, overworked, half-educated and underpaid clerk who is a militarist believes he possesses is purely delusory. Which of the "normal objects" of life are or ever can be his? Life itself is precarious for him beyond all reason, health a possible state attainable if he can afford to purchase enough bottles of Vinol at a corner drug store. His good-natured attempts at adaptation under the all but impossible conditions are a tremendous attest of bravery and essential sweetness, which qualities mercifully draw a curtain between us and the pathos and tragedy of his case.

#### The Medical Trust Hypothesis.

What has been called the Medical Trust is not a trust at all. What would a real medical trust be like? Would it be desirable?

A real medical trust would be an organization of physicians putting the welfare of the organization, of themselves, and of medical affairs in general above all other considerations. We are assuming that such a trust would comprise in its membership all or a large majority of the medical men in the country.

Let us attempt to outline some autocratic acts the "putting over" of which would prove the existence of a medical trust—probable acts.

A medical trust would forbid its members to give free medical service; it would dictate to states, municipalities and insurance companies with respect to the salaries and honoraria paid medical employees; it might attempt to own and control the insurance business; it would safeguard effectually the interests of medical men working in the civil service and other Governmental branches; it would put a stop to certain kinds of prescribing; it would prevent impositions upon the profession and upon labor in the form of health insurance acts in lieu of decent wages; it would be a great factor in preventing wars after the working classes had recuperated just sufficiently from one war to support another, for no war can be carried on without the "connivance" of the medical profession; it would compel the abatement of the public nuisances who swell the ranks of the freak healers on every side; it would open the doors of our hospitals to all its members; it would end the encroachments of the Health Department upon private practice; it would safeguard the profession against legislative menaces; it would discipline the exploiters of alleged cancer cures; it would regulate advertising in the journals; it would



rule against exorbitant and insufficient fees; it would force the states to deal rationally with the problem of the grossly defective, and it would discipline severely the nuisances who advocate socialization of the profession and the reformers who persistently vilify the great body of medical men in order to advance their idiotic schemes.

Now, of course, there is nothing remotely resembling a medical trust. A real medical trust, it must be remembered, would impose its will upon medical men as well as upon the public, in such ways as we have outlined. Such a thing would never be feasible, however desirable some might think it.

The people who assume the existence of a medical trust are plain "nuts."

#### On Quacks and Our Solemn Selves.

The quack tells people just what they want to know. We don't. We are explicit only about dismal and fatal things. We like to tell the truth about hopeless cases. We are wonderfully dogmatic about these disagreeable things.

We never know definitely whether this third boil of Mr. Smith will be the last one to appear. If Mr. Smith has advanced tuberculosis, however, we can say just how long he has to live; at least, we can say that he won't get well.

No, we can't promise when Brown's pyorrhea will be cured, or whether it will be cured at all. Very honest, but very, very unsatisfactory.

The quack says that Robinson will be well in six months and three days. We say that we don't know how long it will take and that he may never get well (something dismal must be worked in whenever possible).

The quack can cheer his patients as much as he pleases, but we cannot guarantee to cure a sebaceous cyst, and besides, we have to mention before we tackle the cyst that erysipelas may supervene.

The quack thus has some advantages over us; in a good many cases, however, we could be a little more human and encouraging, and quite as dogmatic as the quack himself; but as a rule we are too timid to affirm recovery confidently in any circumstances. To be rigidly ethical is sometimes to be rigidly asinine.

#### Answer to Correspondent.

Would there be so much surgery if the rewards were smaller? asks an earnest student of medical affairs.

Ans.—We know, dear child, but we won't tell. We must confess, however, that your question has occasioned a burning blush.

#### Management of the Speech Defect in Public Schools.

Walter B. Swift, of Boston, says the management of the speech defect problem in the public schools demands a medical speech inspector to see all pupils and assign them to either a phonetic, stuttering, or a special class, and to have at the head of each of these divisions a teacher specially trained in one of these lines alone.—(*Educ. Administ. and Supervision*, March, 1916.)

#### Examination of Voice Defects Following Adenoid and Tonsil Operations.

Walter B. Swift, of Boston, says operations for adenoids and tonsils often fail to relieve habits of faulty articulation and consequent school retardation. Vocal drill by one trained scientifically in speech disorder is the surest method to secure speedy permanent relief, in that perfect articulation that makes possible an easy enjoyable conversation.—(*Bost. Med. and Surg. Jour.*, Nov. 18, 1915.)

## Correspondence

### Infantile Paralysis.

To the Editor of THE MEDICAL TIMES:

Owing to epidemic of poliomyelitis in Brooklyn and spreading over the United States, thousands are seeking the cause. What seems plausible to me as a cause is the eating of corn, wheat, etc., by the children (i. e., from one to ten years of age).

In May tons of samples of corn, wheat, etc., were distributed at subway stations and people receiving samples handed them to children, who carried home dozens of packages and some by the hundred, since which time wagon loads have been distributed throughout the borough. These foods are given to children from one year upward, sometimes to eat raw from packages; sometimes sugar and milk is added. They are not heated or cooked. Can a child digest such food? Does the sugar and milk make a good culture media and the stomach a good incubator?

Mothers say they feed those things to the young children because on hot days it saves cooking and the children like them.

Veterinary surgeons have traced spinal meningitis, under various names, from 1813 to the present and are now considering it as a forage or pasture disease from eating tainted corn, wheat, oats, etc. Each investigator has written of different bacteria, but it is agreed that there is one widely accepted theory as to the causation of the disease in horse—that is fungi on the feed. Colts fed on mould corn died on the twenty-sixth day, during experiments in 1906, although the exact mould was not discovered. One writer in Italy states that "moulds are capable of producing poisons, but only at certain stages of their growth and at other times they are entirely inactive."

In the *Journal of the American Veterinary Medical Association*, new series, Vol. I, No. 5, is an interesting article on "A Disease Resembling 'Forage Poisoning' in Horses, etc.," in which the Kentucky Agricultural Experiment Station made an exhaustive report on experiments on Griffin farm, near Lexington, Ky. Authors of this report state that "it seems quite difficult to make a differential diagnosis of cerebro-spinal meningitis (forage poisoning), Mohler, cerebro-spinal meningitis (Encephalitis), also known by some as "Kansas horse disease," Udall, Meningo Encephalitis (Blind Staggers), Haslam Encephalo-Myelitis Stange, Epizootic cerebro-spinal meningitis, Hickman and true forage poison. Pearson, as occurring in various parts of the United States, and of Bornas disease Hutyrá and Marek, as occurring in Europe. Forage poison, according to Pearson, is a disease resulting from ingestion of an infective agent incorporated in the feed, wherein there exists an inseparable relation between the feed and the poisonous material. Though it seems to be true that this relation cannot always be established, there is no conclusive evidence that such a relation might not exist."

Experiments were made on this farm with ear corn, corn fodder, clover hay and oat hay. On the second day of experiment one mule was found acutely ill and transfusion from a healthy horse by jugular vein was made, with no result. A second horse was injected with 5 Cc. from a mule in moribund condition which had been fed on suspected foods. On the second day the horse was dull and sleepy, with a nasal discharge, and on the third day was destroyed in a dying condition. At the same time grains were fed to hogs, white rats, sheep, goats, rabbits, guinea pigs and chickens with negative results.

It is also generally known that chicken farms lose thousands of chickens yearly from paralysis, presumed to be from eating tainted foods. The relation of an exclusive rice diet to Beri-Beri is also recognized.

Is there any relation to the feeding of corn, wheat, barley, oats, etc., to infantile paralysis? Inasmuch as public institutions are free from the epidemic, because they would not serve any but freshly cooked cereals, is it not a mooted question as to the relation of tainted food to the horse and chicken and the relation of similar disease to children?

LAWRENCE P. A. MAGILLIGAN, M. D., M. A.

### The Medical Brotherhood.

To the Editor of THE MEDICAL TIMES:

The issue of THE MEDICAL TIMES for July contains an article by Dr. Jacobson entitled: "On Artificial Standards," in which the following occurs: "Dr. Meltzer, in a letter recently sent out inviting physicians to join his brotherhood, remarks that the recipient could hardly find any potent reason for not joining it! Pretty cool, eh? Well, we have several reasons for not joining it. There are no dues. The literature accompany-

ing Dr. Meltzer's letter reads exactly like that of the Wall Street preparedness propaganda. The philosophy outlined is naive, to say the least and say it charitably. From a standardization even of ideals heaven forbid us." Besides two copies of this issue which were sent to me, perhaps from the TIMES office, I received a clipping of that article from a well informed man who writes to me "don't mind him \* \* \*". I certainly do not feel the need of entering into a discussion of the merits of the writer of the above mentioned article. However, I am very much interested in the further success of the Medical Brotherhood, and since you, Mr. Editor, are yourself an enrolled member of that organization, and some of your contributing editors are members of the Committee, you may perhaps give me some space in your valued paper to state something about the organization.

I enclose a reprint from *Science*. You will thus be able to judge for yourself whether it reads like that of a "Wall Street preparedness propaganda," and whether the outlined philosophy is so naive as the Miscellany Editor chooses to designate it. There is, indeed, no fee, but there is no objection to spontaneous contributions. So far these contributions exceed \$700. But the main financial source is obtained from the Carnegie Endowment for International Peace, of which Mr. Elihu Root, President Butler, President Pritchett and others of similar standing compose the Executive Committee. My original address on the subject was meant to be an academic one and was delivered at a dinner of the Columbia Biochemical Society. It was at the urgent suggestion of men of high standing within the profession and outside of it, that I undertook to give my suggestion a practical turn. Of the non-medical men I need only mention such names as Andrew D. White and Charles W. Eliot. Our attempt was certainly crowned with success. Without much publicity the Medical Brotherhood is at present composed of more than 14,000 members, among whom are to be found the best medical men in the country. Furthermore, a good many prominent medical men from neutral countries—Switzerland, Holland, Denmark, Sweden, etc., asked to be enrolled as members. It is now a question whether it is desirable to have the membership list much larger; the larger the membership of an organization is, the less high its ideals have to be in order to be appreciated by such a great number. Men of a better type and with higher conceptions as to their duties form always the minority among great masses. Our object seems, to us at least, very simple.

We expect of all men that they will comply with the two duties—patriotism and humanity. In times of war and even in times of peace it is evidently not easily possible to fulfill both duties simultaneously when they seem to be antagonistic to one another. However, in this regard, medical men are in the fortunate position to be an exception. The Geneva and Hague Conventions require of them to remain humane even during the war. The physician who is an essential element in the war and has to show as much courage as any combatant, is bound in duty to treat friend and foe alike. The sick prisoner of war has to be treated with the same consideration as a compatriot. In therapeutics, not only surgery and drugs are concerned, but also sympathetic psychical treatment is an important factor. This has been demonstrated in the present frightful war in which nervous shock seems to have been one of the important results of the battle. None needs more sympathy than the sick prisoner of war. Are we physicians prepared to comply with this requirement? It could hardly be accomplished without a prolonged moral and intellectual training. Committees of the Britain foreign office took a good deal of trouble to show that some German physicians did not comply with it. Similar reports we read from French sources. Will we be different than the Germans? It is no doubt that it needs a great deal of mental and moral preparation in time of peace to be able to comply with such higher requirements in time of war. This is a part of the object of the Medical Brotherhood. "We wish to bring to their consciousness the higher ethical position which all civilized countries accord to and expects of them. The nearest and simplest end to be gained from such information is the consciousness of a sense of higher duties which comes from the knowledge of one's higher moral dignity." "The Medical Brotherhood of this country wishes to gather into its union those members of the medical profession who have a vein of idealism in them and who are willing to serve their country as patriots and humanitarians. It appeals further to the inspired ones to spread this gospel, wherever they find opportunity, with impressiveness combined with patience and tolerance."

But "this organization must consist of medical men and women who believe in the advanced ethical position of the medical profession and are willing to live up to this belief. It is as certain as day that only good and no harm can come from such a belief."

S. J. MELTZER,  
President, Medical Brotherhood.

## Inheritance and Environment.

To the Editor of THE MEDICAL TIMES:

During the last few years it has been the popular fancy to attach far greater importance to the effect of their environment upon children than to the laws of inheritance.

The deep thinker acknowledges the importance of proper environment, but at the same time considers what traits or weaknesses the child is likely to develop through inheritance from its parents, remembering that the "iniquities of the fathers shall be visited upon the children, even unto the third and fourth generations."

No human being asks to be brought into this world, and coming therefore without his assent, the conditions under which one is born should be made as favorable and as conducive to good health as is possible.

It is said that the new life is not given every care and protection, from the time of conception at least. The true mother should think the right thoughts, do the proper things, and above all, be prudent in her eating and drinking throughout her period of pregnancy.

The mother in the middle walks of life, on asking her physician what she should do, will be told to live naturally, to keep good hours, to take regular exercise, and to do all things moderately while attending to her household duties. She is much more apt to follow these suggestions, than is the so-called society woman, who, on being given much the same advice, asks if she may not take her usual cocktail before dinner, her wine with her repast, and her cigarette after. Her physician seldom lays down the line to her, and often fails to urge upon her the necessity of living and breathing, not only for herself, but for the little one of the next generation as well.

The society woman is seldom made to realize that by living a clean, regular, high-class life during this period, she will be repaid by having a strong, healthy, normal child. The anaemic, pale, sometimes emaciated baby, usually owes its condition to the intemperance of its mother.

Then, too, the mother of the middle classes is usually able to nurse her child, a boon which is not so frequently enjoyed by her more fashionable sister, who is often accused of refusing to nurse her child when the plain truth is, that she is unable to do so because of her own physical condition, due to her irregular living, to tobacco and alcoholic stimulation. And by this is not meant drinking to excess, but rather the constantly having a small quantity of alcohol in one's system.

At best we always have our battles to fight, both mental and physical, the effects of which fall upon the child, and it is only fair and sensible to protect it so far as is possible, so that it may have the freshest, cleanest start in the world.

The mother's direct responsibility to the child begins at the very hour of conception, and it is a prime duty of the physician to impress this fact indelibly upon the mother's mind.

If both parents were brought to full realization of these facts there would be fewer cases of tuberculosis, fewer cases of epilepsy, and far fewer feeble-minded children.

That the influence of heredity is very great is clearly demonstrated by the strong likenesses between parent and child, by their similarity of tastes, of manners, and of inclinations.

It is no less true that a proper environment is indispensable for the little one after its arrival, for its mind may be well compared to a blank wax cylinder of a phonograph, which receives, and later faithfully reproduces, each new impression that is given it. If care is taken in the making of this human record, there will be better men and women, and far less misery and suffering in this world of ours.

G. CHASE.

## Sutures of Nerves in Wounds.

After an experience with about 250 cases of wounds of nerves, only 19 of which were actually sutured, Dumas is of opinion that suture should only be done as a last resource, for its results are far from satisfactory. He has tried all methods, but none have yielded the restoration of motor function as a result. Two important points are involved in the operation: the freeing of the nerve, and its protection against the formation of a compressing scar. He has observed that, in the fibrous tissue interposed between the two ends of the nerve, there are, histologically, nervous elements in process of regeneration. Sometimes, the motor function has already been recovered in part, whilst the electrical conduction is still absent. After dividing the fibrous tissue, the nerve should be surrounded with a sheath of fat so as to prevent adhesions.—(*Journ. des Praticiens.*)

The result of Excess is like the paradoxical infinitude of the sea, ever rolling into invisibility, yet always seen.

MATTHEW WOODS.





### The Medical Needs of Modern Armies.

Interesting side lights on the need for a sufficient supply of medical officers in war are shed by correspondence to the London *Lancet* of November 20, 1915. The secretaries of the Harveian Society called a meeting of that society to discuss the organization of the British medical profession for war service, and in their official announcement said: "This topic is assuming very great proportions, for the actual personnel of the Army Medical Service must already be approaching 10,000 in place of the peace establishment of 1,000." And on the same page another communication says: "The authorities at the War Office are very uneasy about the supply of doctors to the Army. At their request a War Emergency Committee in connection with the British Medical Association has been established, and a committee is working with all its power to see if they can find by the middle of January some 2,000 odd medical men which the War Office deem necessary."

It appears, then, that the British army will shortly include no less than 12,000 physicians with the colors, in order to satisfy present immediate needs in the medical service. This despite the fact that the main bulk of the fighting is in Flanders, where the conditions of trench warfare and short haul permit of great economies in medical personnel through the ability to eliminate many of the intermediate sanitary formations which are ordinarily required to bridge the gap between the firing line and the base.

Clearly the situation as to medical officers in which Great Britain finds itself has many morals for us. We must appreciate that in the United States, too, the day of little things is over and that no question of national preparedness is complete without the inclusion of the medical profession in civil life in terms of many thousands. Such immense numbers of troops will be necessary that any regular medical personnel which could be maintained in peace will scarcely suffice to leaven the mass in war. Efficient administrative machinery must be created and maintained to secure and instruct in the elements of their medico-military duties the vast mass of medical men whose services will be required. This additional work will chiefly fall upon the Medical Corps of the army, now both actually and relatively too small to do its routine work in time of peace. Efficiency demands that not only must the Medical Corps be given enough officers in the coming defense plans to do the peace work of the standing army, but it must share proportion-

ately in the large extra and unassigned list of officer instructors which all schemes for defense agree upon as being absolutely necessary for the education and training of the second line forces.

An army is a many-sided and very complex structure, every part of which has a definite relation, usefulness and proportion to the rest. This is a fact of which many of the civilians upon which we have to depend for service legislation are ignorant, and one which a certain few line officers who are better informed seem to choose to ignore. To attempt to pile up fighting men without sufficient medical personnel to maintain physical efficiency defeats any expectation of securing maximum fighting strength. The Medical Department wants only what is necessary. It must insist on having enough officers in peace time to make it feel a reasonable competence to perform satisfactorily the tasks which devolve upon it in peace. It will expect in time of war a personnel adequate to perform war duties. With anything less than this reasonable provision it will not be satisfied.—(*The Military Surgeon.*)

### The Treatment of Tetanus.

The *British Medical Journal* says the experience gained during the first year of the war has confirmed the opinion that from 500 to 1,000 American units of tetanus antitoxin is a sufficiently large prophylactic dose for the majority of cases, and that it is advisable, in severe wounds, to repeat the dose once or twice at intervals of a week. Occasionally cases occur in which antitoxin appears to have little preventive effect. These cases should be recorded with minute details, so that our knowledge of them may be increased and an explanation of their occurrence obtained. Those cases of tetanus which develop some weeks after the receipt of an injury may be due to the reactivation of a quiescent focus by too early or too energetic active or passive movement.

Sakagami says the serum of tuberculous patients has smaller bactericidal power than normal serum upon the staphylococcus and streptococcus. Serum of those suffering from staphylococcal infections has a little stronger power than that of tuberculous patients. The serum of those suffering from tuberculosis and staphylococcal infections at the same time has more power than the serum of those suffering from tuberculosis only.

## A Temporary Diet for Infants in Summer Diarrhea

Mellin's Food  
4 level tablespoonfuls

Water (boiled, then cooled)  
16 fluidounces

Each ounce of this mixture has a food value of 6.2 calories—affording sufficient nourishment and in a form readily assimilable.